JOHN A. SEAVERNS

UNITED STATES

Business Man's, Farmer's & Gardener's

COMPANION,

AND COMPLETE

DOMESTIC ANIMAL DOCTOR.

COMPRISING VALUABLE INFORMATION IN RESPECT TO

CONTRACTS, BILLS, NOTES,

AND THE

VARIOUS FORMS OF LAW:

Deduced from the Opinions of Judges Story, Kent, and others;

FORMING

A COMPLETE LEGAL ADVISOR.

ALSO, THE VERY BEST DIRECTIONS FOR

Analyzing, Enriching, and Tilling the Soil;

DRAWN FROM THE

Chemical Investigations of Liebig, Sir H. Davy, and others.

ALSO, AN EXCELLENT

SYSTEM OF GARDENING.

BY WM. COBBITT, M. P.

TO WHICH IS ADDED, THE MOST CELEBRATED METHOD OF

RAISING AND DOCTORING HORSES, CATTLE, SHEEP, AND SWINE,

EVER PRESENTED TO THE PUBLIC.

BY WILLIAM YOUATT & FRANCIS CLATER.

NEW YORK:
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of New-York.

Business Man's & Farmer's Lawyer;

OR,

LEGAL & COMMERCIAL INSTRUCTOR.

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BY WM. COBBITT, M. P.

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BY W. YOUATT.

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THE

BUSINESS MAN'S AND FARMER'S

LAWYER,

OR, LEGAL AND COMMERCIAL INSTRUCTOR.

CONDENSED FROM THE OPINIONS OF JUDGE STORY, JUDGE KENT, AND OTHERS, OF THE HIGHEST AUTHORITY IN THE LEGAL PROFESSION.

A BILL OF EXCHANGE

Is an open letter of request, addressed by one person to a second, desiring him to pay a sum of money to a third, or to any other to whom a third person shall order it to be paid; or it may be payable to bearer.

The one who draws the bill is called the drawer; the one to whom directed, the drawee; the one to whom payable, the payee. When the drawee accepts the bill, he is called the acceptor; and if the payee (the bill being negotiable,) should endorse it, and deliver it to another, he then sustains two characters, being called endorser as well as payee, while the party to whom the bill is endorsed, is called an endorsee; and should this endorsee

endorse it to another, he then acquires two characters, that of first endorsee, and second endorser, and the one to whom he thus transfers the bill, is called a second endorsee; and so throughout any number of endorsements without limitation.

Bills are divided into Foreign Bills of Exchange, and inland Bills of Exchange.

A Bill of exchange is properly denominated a foreign Bill, when it is drawn in one state or country upon a foreign state or country.

So, also, Bills drawn upon one State of the United States on persons in another, are considered as foreign Bills of Exchange.

A Bill of Exchange is properly denominated an inland bill, when both the drawer and the drawee reside in the same state or country.

A PROMISSORY NOTE

Is a less complicated kind of security, and may be defined to be an engagement in writing, to pay a certain sum of money mentioned in it, to a person named, or to the bearer at large.

Promissory Notes, made payable to order, may be assigned and endorsed, and action maintained thereon as on inland bills of exchange.

The signer of a Promissory Note is called the maker; whoever has the legal property in the instrument is called the holder; and the characters of first and second endorsers and endorsees may be created and continued to an unlimited extent, as in a Bill of Exchange.

ACCEPTANCE.

An Acceptance is an engagement to pay a bill of exchange according to the nature of the acceptance. The circumstances which generally occur in an acceptance, are, that the party to whom the bill is addressed binds himself to the payment, after the bill has issued before it becomes due, and according to its tenor; and this is usually done by either subscribing his name, or writing the words *accepts*, or *accepted*, *A. B.* But a man may be bound as acceptor without any of these circumstances.

If a person in writing, authorize another to draw a bill of exchange, and stipulate to honor the bill, and the bill be afterwards drawn, and taken by a third party, on the credit of that letter, it is equal to the acceptance of the bill.

By the Revised Statutes of the State of New-York, no person within this State can be charged as an acceptor on a bill of exchange, unless his acceptance be in writing; and the holder may require the acceptance to be upon the bill, and a refusal to comply, will be deemed a refusal to accept.

The acceptor of a bill is the principal debtor; he cannot assume the attitude of a surety, though only an accommodation acceptor, and the equitable doctrine respecting sureties does not apply to him; and if it did, it would not avail him in a suit at law upon a written acceptance, for which, by the law merchant, there is a sufficient consideration implied.

An Acceptor is bound to know the drawer's handwriting, and cannot resist payment to a *bona fide* holder, though the bill be a forgery.

The holder of a bill of exchange, on non-acceptance, and protest and notice thereon, has an immediate right of action against the drawer, and does not acquire fresh right of action on the non-payment of the bill when due.

The drawer and endorser are liable to an action by the holder immediately after the bill is refused acceptance, and before it is payable, on giving due notice of non-acceptance. And the liability is not discharged by the holder's subsequently protesting the bill for non-payment.

Where a bill has been protested for non-acceptance, and due notice is given to the endorser, it is no objection that the demand of payment, and protest, &c., were a day too late, as they are not essential where the liability of the party is already fixed.

If the drawer has no funds in the drawee's hands, the payee may sue immediately after non-acceptance, without giving notice, &c.

After presentment and non-acceptance of a bill of exchange, and due notice given, it is not necessary that it should be presented for payment.

Absence of the drawee from home, when called on for acceptance, is not a refusal to accept.

ACCOMMODATION BILL AND NOTE.

The relative rights and duties of parties who endorse a promissory note for the accommodation of the maker, are the same as in the case of a business note; so that, due notice of the dishonor of such accommodation note having been given, a subsequent endorser who pays it, may recover of a prior endorser the whole amount paid, and not merely a contribution, as in the case of sureties.

If one of two joint payors and endorsers of a note, discounted for the accommodation of the maker, die before the note falls due, his representatives are not liable to the holder for any part of the amount.

It is always understood that a note endorsed for the maker's accommodation, to be discounted in a bank, is to be renewed; but a renewal is not an extinguishment of the debt, and will not destroy the security of a mort gage, or other guaranty, given to indemnify the endorser, when the original note was discounted.

Wherever a promissory note, endorsed by the payee for the accommodation of the maker, is negotiated by the latter in violation of an agreement between them, the holder cannot recover against such endorser, unless he received the note in good faith, for a valuable consideration, and without notice of the arrangement.

When an accommodation note is drawn for $2500, and the payee declines to endorse it for the whole amount, but directs the bank, where the note is payable, to pay on it $750; such note is, in legal effect, a note for $750, and may be declared on as such.

AGENT.

The rule that a contract, under seal, entered into by an agent, to be binding upon the principal, must, on its face, purport to have been made by the principal, and to have been executed in his name, and not in the name of the agent, is applied in all its rigor when the validity of the instrument in question depends upon the annexation of a seal; but, it seems, in less formal writings, such as the evidence of ordinary commercial transactions, a more liberal interpretation prevails; in such cases, in furtherance of the public policy of encouraging trade, if it can, upon the whole instrument be collected, that the true object and intent were to bind the principal, and not merely the agent, courts of justice will adopt that construction of it, however it may be expressed.

A person may draw, accept, or endorse a bill by his agent, and it will be as obligatory upon him as though it was done by his own hand; but the agent in such a case, must either sign the name of the principal to the bill, or it must appear upon the face of the bill itself, in some way or another, that it was in fact done for him, or the principal will not be bound; the particular form of the execution is not material if it be substantially done in the name of the principal.

A person who signs a note in the name of another as his attorney, without any authority for that purpose, is personally liable on the note to the party who accepts the note under such mistake or imposition.

The drawer of a bill, when sued by the payee, may prove in defense that he was merely an agent, and not to be held responsible; and to prove this, he need not show a special agreement; a general understanding that he was a mere agent, may be sufficient.

AGREEMENT.

A separate agreement with regard to the payment of promissory notes, cannot be set up in bar of an action upon them. The remedy is upon the agreement.

The non-performance of an agreement collateral to the execution of a note, furnishes no defense to an action on the note. The remedy is by action for the breach of the collateral agreement, or recision of the principal contract.

A written agreement by the payee of a note, with the maker, that if it should not be convenient for the maker to pay the note at maturity, he would wait his convenience, cannot be pleaded in bar to an action on the note, with an averment that it had not been convenient to pay the same. The defendant's remedy, if he has suffered injury, is on the contract.

If an action by the holder against the endorser of a note, the drawer cannot prove that the plaintiff agreed not to hold the defendant responsible for his endorsement.

Parol evidence is admissible on the part of an endorser, to show a special agreement between him and the endorsee, where a promiser's note was endorsed, that the latter should sue the maker, and if he could not obtain payment, that then the endorser should be liable.

A covenant to deliver up a promissory note is a good bar to an action on the note.

Where there is a contract of hiring for a definite time,

at a certain rate per day, and a part of the time only having elapsed, the parties settle the amount of the wages which had been earned, and the hirer gives his note to the servant for the amount; in an action on the note, it is no defense that the payee had left the maker's service before the expiration of the time for which he had been generally hired; although had there been no subsequent modification of the agreement, he could not have recovered wages until he had served the whole period agreed on.

An agreement between two endorsers that they will divide the loss between them, is a contract, and founded on a sufficient consideration; and, being a collateral contract by parol, parol evidence may be given to prove it.

A promissory note, taken by express agreement, in payment of a judgment, is an extinguishment of the preceding debt.

Any agreement between the holder and drawer of a bill which shall suspend the right of the holder to prosecute on the bill, will discharge an endorser.

Where the consideration of a promissory note is an agreement by the payee to do what afterwards becomes impossible to be done by him, an action cannot be sustained upon such note by reason of a failure of consideration.

ALTERATION.

An alteration of an instrument is something by which its meaning or language is changed, in a material or immaterial particular. If what is written upon or erased from the paper containing an instrument, have no tendency to produce this result, nor mislead any person, it will not be an alteration.

The alteration of an instrument does not necessarily avoid it; the alteration may have been made before delivery, or by consent of parties, in which case the validity is not affected.

The holder of a bill has no right to make an alteration in it to correct a mistake, unless to make the instrument conform to what all parties to it agreed, or intended it should be.

If a note be altered in a material point, without the consent of the party to be affected by it, it is void as to such party, and this rule applies to an alteration changing the liability of an endorser from a conditional to an absolute engagement

The interlineation of the words "or bearer," in a due-bill, is a material alteration, and if without authority, will vitiate it.

The addition of the words, "with interest from the date," is a material alteration of a promissory note, and avoids it.

The alteration of a note from "I promise," to "We promise," is not a material alteration, and does not avoid the note.

AFFIDAVITS AND DEPOSITIONS.

A deposition is the written testimony of a witness under oath. An affidavit is simply an oath in writing subscribed by the party making the same, and sworn or affirmed to before some proper person.

The following is the usual form:

County of S———, ss.

J. S., of said city and county, grocer, being duly sworn, doth depose and say, that on the twentieth day of April, instant, deponent was walking near the hour of 12 o'clock, noon—deponent saw the driver of Smith's omnibus, No. —, strike and beat with his whip, one J. S. personally known to deponent.

J. S.

Sworn to before me, this 21st day of April, 1850.

LEWIS CLARK,
Justice of the Peace.

An affidavit should set forth nothing but facts, because, in strictness of law, matters of inference or argument are not allowed.

However, matters of hearsay or information, and which the deponent believes to be true, but cannot assert positively of his own knowledge, may be set forth as follows:

"And deponent further saith that he has been informed, and verily believes to be true, &c. &c.

Another mode of affidavit is as follows:

On the 25th day of June, in the year one thousand eight hundred and forty, [then go on and make state-

ment of the particular matter in precise and careful language, in the ordinary style of making a written statement; sign your name to it; go before a commissioner of deeds. judge, or any proper person: he will administer the oath and add the following certificates:]

State of ———, } *ss.*
and County of }

On this 1st day of July, in the year one thousand eight hundred and forty, before me, personally appeared [insert the name of the party signing the statement], who, being by me duly sworn, did depose and say, that he has read [or "heard read," as the case may be] the foregoing [if this certificate is put on the back of the statement, say "within;" if attached, say "annexed"] statement, and knows the contents thereof, and that the same is true, of his own knowledge,* except as to the matters which are therein stated to be on the information or belief of the said [insert name of subscriber] the subscriber aforesaid; and as to these matters, he believes it to be true.

JOHN R. GRAFT.
Justice of the Peace.

* Should the statement set forth nothing but what is within the knowledge of the subscriber, this clause, from the word "except" to the conclusion, may be omitted.

BILL OF LADING.

Shipped by A. B., on board the ship called the Patrick Henry, C. D., master, now in the port of New York, and bound for Liverpool, to say: [here describe the goods,] being in good order and well conditioned, marked and numbered as in the margin, and to be delivered in the like good order and condition (danger of the seas excepted), unto E. F., or to his assigns, he or they paying freight for the said goods and the primage and average accustomed. In witness whereof, I, the said master, have affirmed to three Bills of Lading, of this tenor and date; one of which being accomplished, the others stand void.

Dated in New York, the 1st day of January, 1850.

(Contents unknown.) J. D. B.,

Master.

MARRIAGE CERTIFICATE.

This is to certify, that A. B. and C. D. were, with their mutual consent, lawfully joined together in holy matrimony, which was solemnized by me, in the presence of credible witnesses.

Given at ——, this —— day of ——, in the year of our Lord one thousand eight hundred and —.

E. F.

LEGAL INTEREST TABLE.

Exhibiting the legal rates of interest allowed in the different States and Territories within the United States, with the punishment inflicted for usury in each State.

Maine—Six per cent.; forfeit of the claim for usury.

New Hampshire—Six per cent.; forfeit of thrice the amount unlawfully taken.

Vermont—Six per cent.; recovery in an action, with costs.

Massachusetts—Six per cent.; forfeit of thrice the usury.

Rhode Island—Six per cent.; forfeit of the usury and interest on the debt.

Connecticut—Six per cent.; forfeit of the whole debt.

New York—Seven per cent.; usurious contracts void.

New Jersey—Six per cent.; forfeit of the whole debt.

Pennsylvania—Six per cent.; forfeit of the whole debt.

Maryland—Six, and on tobacco contracts eight per cent.; usurious contracts void.

Virginia—Six per cent.; forfeit double the usury taken.

North Carolina—Six per cent.; contracts for usury void, and forfeit double the usury.

South Carolina—Seven per cent.; forfeit of interest and premium taken, with costs to debtors.

Georgia—Eight per cent.; forfeit three times the usury, and contract void.

Alabama—Eight per cent.; forfeit interest and usury.

Mississippi—Eight per cent., by agreement, as high as ten per cent.; forfeit the usury.

Louisiana—Five per cent., bank interest six, and conventional as high as ten; beyond that, contract void.

Tennessee—Six per cent.; usurious contracts void.

Kentucky—Six per cent.; usury recoverable with costs.

Ohio—Six per cent., on written agreements may go as high as ten; beyond this, contract void.

Indiana—Six per cent.; a fine of double the excess.

Illinois—Six per cent.; forfeit threefold the amount of the whole interest.

Missouri—Six per cent., by agreement as high as ten; beyond this, forfeit of interest due and usury taken.

Michigan—Seven per cent.; forfeit usury and one fourth the debt.

Arkansas—Six per cent., by agreement as high as ten; forfeit usury, and contract void.

Florida—Eight per cent.; forfeit interest and usury.

Wisconsin—Seven per cent., by contract, any amount agreed upon by the parties.

Iowa—Seven per cent., by agreement as high as twelve; forfeit three times the excess.

In England and France, legal interest is five per cent.; in Ireland six.

BILL OF EXCHANGE.

————————185

Exchange for $5,000.

Ten days after sight, pay to the order of C. M. Hines, Five Thousand Dollars, value received, and charge to account of

JOSEPH GREEN.

To L. MORRIS,
New Rochelle, N. Y.

SET OF BILLS OF EXCHANGE.

————————185

Exchange for $10,000.

Thirty days after sight of this my first of Exchange, (second and third unpaid,) pay to the order of F. M. Hines, Ten Thousand Dollars, value received, and charge the same to account of

GEORGE GREEN.

To Messrs. SHIPMAN & Co.,
Louisville, Ky.

NOTES NEGOTIABLE.

On Time.

$150 00. P———, Oct. 8, 185 .

Four months from date, for value received, I promise to pay B. Mason, or order, one hundred and fifty dollars. JOHN BROWN.

Notes on time are liable to interest after they become due, whether demand is made for their payment or not.

On Demand.

$50 00. P———, Oct. 8, 185 .

On demand, for value received, I promise to pay James Quirk, or order, fifty dollars.

P. O. SMITH.

Notes on demand are liable to interest from the time demand is made until the payment of them.

Payable at Bank.

$500 00. P———, Oct. 8, 185 .

Ninety days from date, for value received, I promise to pay James Galen, or order, five hundred dollars at the Chester County Bank.

MOSES SHARP.

Payable by Installments.

$200 00. P———, Oct. 8, 185 .

For value received, I promise to pay Peter Smith, or order, two hundred dollars, in the following manner: fifty dollars in two months, fifty dollars in six months, and one hundred dollars in one year from date, with interest.

C. WELDING.

NOTES NOT NEGOTIABLE.

A note not negotiable, may be transferred by endorsement, but the endorsee is not thereby vested with power to commence suit for its payment in his own name, as in case of a negotiable note. To enforce the collection of this kind of notes the holder must sue in the name of the payee.

On Time.

$45 00. K———, Oct. 8, 185 .

Thirty days from date, for value received, I promise to pay James B. Haight, forty-five dollars.

WM. ASHTON.

On Time, with Interest.

$100 00. K———, Oct. 8, 185 .

One month from date, for value received, I promise to pay James Bird, one hundred dollars with interest.

GEO. BLIGHT.

Payable to Two.

$600 00. K———, Oct. 8, 185 .

On demand, for value received, I promise to pay John M. Jordan and James Githens, six hundred dollars.

WM. D. LONG.

Made by Two.

$200 00. K———, Oct. 8. 185 .

On demand, for value received, we severally and jointly promise to pay Henry Baker, two hundred dollars.

L. K. CHILDS,
C. C. CHILDS.

Either of the signers to a note of this form are responsible for its payment.

DUE BILLS.

A due bill is a mere pledge to pay a certain amount of money, or other property, specified therein, in consideration of an equivalent received.

FORMS FOR DUE BILLS.

Cash on Demand.

$15 00. K———, Nov. 8, 185 .

Due David Birkey, fifteen dollars, on demand.

F. WHITE.

Cash on Time.

$10 00. K———, Nov. 8, 185 .

Due James A. Quackenbush, ten dollars, three months from date.

H. W. FISH.

Payable in Wood.

$20 00. K———, Nov. 8, 185 .

Due James D. Lamb, twenty dollars, payable in wood, next February, at the current price.

T. W. BOYD.

Payable in Work.

$8 00. K———, Nov. 8, 185 .

Due Hiram L. Wharton, eight dollars, payable in work.

F. K. LAIGHT.

BONDS.

Bonds are of two kinds, *simple* and *penal*. A simple bond is an obligation to pay a certain amount of money, or to perform, or not to perform, some specified act.

FORM OF A SIMPLE BOND.

Know all men by these presents, that I, B. L., of Coutsville, am holden and firmly bound to K. M., of M——, in the sum of five thousand dollars, to be paid to the said K. M., or his certain attorney, executors, or administrators, or assigns; for which payment well and truly to be made, I bind myself, my heirs, executors, and administrators, firmly, by these presents.

Signed with my hand, sealed with my seal, and dated Oct. 8, 185 . B. LEECH, (L. S.)

Signed, sealed, and delivered, in the presence of T. Sutton.

ORDERS.

For Money.

$12 00. K———, Oct. 8, 185 .

Messrs. Hines & Davis.

Please pay the bearer twelve dollars, and charge the same to the account of

JOSEPH GREEN.

For Merchandize.

$10 00. K———, Oct. 8, 185 .

Messrs. Hines & Davis.

Gents.: Please let the bearer have ten dolllars in merchandise, and place the same to the account of Yours, &c.

T. L. MORRIS.

K———, Oct. 8, 185 .

Please let Mr. F. M. Hines have such goods as he may wish, and charge to account of

GEORGE GREEN.

To Messrs. SHIPMAN & Co.

If S. & Co., resided in another town from the one in which the order is dated, the name of the town in which they reside should be written under their names.

DRAFTS.

Drafts at Sight.

$150 00. K———, Oct. 8, 185 .

At sight, pay to the order of B. B. Briggs, one hundred and fifty dollars, value received, and charge the same to the account of

F. M. HINES.

To W. N. LAWSON,

Orange Co.

Thirty Days after Date.

$1,000 00. K———, Oct. 8, 185 .

Thirty days after date, pay to the order of J. S. Turney, one thousand dollars, and place the same to the account of

J. HUTCHINS.

To PAUL NORRIS,

Baltimore, Md.

LEASES.

A lease is the conveyance of lands for one or more years, or at will, in consideration of a return of rent or other recompense.

A lease not in writing may be valid for a short time, but it will prevent dispute, and is better to be in writing.

FORMS OF A LEASE.

This indenture, made the first day of January, in the year one thousand eight hundred and fifty, between L. M., in the town of ———, county of ———, and State of ————, of the first part, and M. O., of the same place, of the second part, witnesseth, that the said party of the first part has let, and by these presents does grant, demise, and let, unto the said party of the second part [here describe premises; if land say, "all that certain piece or parcel of land known," &c., or, "bounded and described as follows, to wit:"] with the appurtenances, for the term of five years, from the first day of May, one thousand eight hundred and fifty, at the yearly rent or sum of one hundred dollars, to be paid in equal half-yearly payments. And it is agreed that if any rent shall be due and unpaid, or if default shall be made in any of the covenants herein contained, then it shall be lawful for the said party of the first part to re-enter the said premises, or to destrain for any rent that may remain due thereon. And the said party of the second part does hereby covenant to pay to the said party of the first part, the said yearly rent as herein specified, and that, at the expiration of the said term, the said party of the second part will quit and surrender the premises hereby demised, in as good state and condition

as reasonable use and wear thereof will permit, damages by the elements excepted. And the said party of the first part, does covenant that the said party of the second part, on paying the said yearly rent, and performing the covenants aforesaid, shall and may peaceably and quietly have, hold, and enjoy, the said demised premises for the term aforesaid.

In witness whereof, the parties to these presents have hereunto set their hands and seals, the day and year first above written.

L. M. (L. S.)
M. O. (L. S.)

Sealed and delivered in the presence of T. E. B.

MARRIAGE SETTLEMENTS.

A Jointure Settled on an intended Wife.

This indenture, made and agreed upon between L. E. of ——, and P. T. of ——, on the one part, and O. E. of ——, widow, on the other part, witnesseth, that the said L. E., in consideration of a marriage to be had and solemnized between him and the said O. E., does, for himself, his heirs, and assigns, covenant, grant, and agree, to and with the said P. T., his heirs and assigns, shall and will forever hereafter stand seized of and in that tract of land situate in ——, whereof he is now actually and lawfully seized in fee simple, to the uses following, that is to say, to the use of the said L. E., for and during the term of his natural life, without impeachment of waste, and after his said marriage with the said O. E., and after his decease, to her use, so long as she

shall remain his widow, and unmarried, without impeachment of waste, for her jointure, and in lieu and satisfaction of her whole dower in his estate, and after his decease, and the expiration of her said estate, to the use of his heirs and assigns forever.

And the said L. E., in consideration of the premises, and one dollar paid, does, for himself, his heirs, executors, and administrators, covenant and agree with the said P. T., brother to the said O. E., his executors and administrators, that said marriage being solemnized, he the said L. E., will carefully, and according to his best judgment, husband, manage, and preserve her estate which she now has, and which during the said marriage she may receive by descent, or the statute of distributions from her relations; and take and recover to his own use, only the interest and income thereof, during the said marriage, and at the expiration thereof, by his will or otherwise, he the said L. E., will leave secured to her, if she survives him, or to her heirs, if he shall survive her, all her said estate, except the said interest and income thereof during the said marriage, and except such parts of her said estate as shall be unavoidably consumed or destroyed, or be worn out in common use, or lost by the insolvency of those to whom the same, or any part thereof, shall be lent on interest; and that the said O. E., at any time in her life-time, shall have power by her appointment testamentary, to name the person or persons who shall be entitled to have her said estate after her decease; and that, by virtue thereof, it shall be lawful for such person or persons to receive and hold the same. And the said O. E., in consideration of the premises, and one dollar, paid her by the said L. E., does, for herself, her heirs, executors, and administrators, covenant and agree with him, the said L. E., that the said land, so assigned to her, shall be in full satisfaction of her dower in his estate, and shall bar her from claiming the same, if she shall survive after the said marriage; and further, that if the said marriage be had, and she

survive him, she will not claim any share in his personal estate, but her retaining her own estate, as aforesaid, shall be a bar to her claim to any part of his personal estate after his decease, unless some part thereof be given to her by his will, or some act of his done after the execution hereof.

In witness, &c.

FORM OF A WILL.

In the name of God, Amen. I, O. B., of the town of ———, in the county of ———, and State of ———, being of sound mind and memory (blessed be Almighty God for the same), do make and publish this my last will and testament.

I give and bequeath to my sons Jacob and Oren, eight hundred dollars each, if they shall have attained the age of twenty-one years before my decease, but if they shall be under the age of twenty-one at my decease, then I give to them one thousand dollars each, the last mentioned sum to be in place of the first mentioned.

I give and bequeath to my beloved wife Susan, all my household furniture and all the rest of my personal property, after paying from the same the several legacies already named, to be hers for ever; but if there should not be at my decease sufficient personal property to pay the aforesaid legacies, then so much of my real estate shall be sold as will raise sufficient money to pay the same.

I also give, devise, and bequeath, to my beloved wife Susan, all the rest and residue of my real estate as long as she shall remain unmarried, and my widow, but on her decease or marriage, the remainder thereof I give

and devise to my said children and their heirs, respectively, to be divided in equal shares between them.

I do nominate and appoint my beloved wife Susan to be the sole executrix of this my last will and testament.

In testimony whereof, I hereunto set my hand and seal, and publish and decree this to be my last will and testament in presence of the witnesses named below, this —— day of ——, in the year of our Lord, one thousand eight hundred and ——.

O. B. (L. S.)

Signed, sealed, declared, and published by the said O. B., as and for his last will and testament, in presence of us, who, at his request and in his presence, and in presence of each other, have subscribed our names as witnesses hereto.

C. D., residing at ——, in —— county.

F. G., residing at ——, in —— county.

INDENTURE OF APPRENTICESHIP.

This indenture, made this 1st day of October, in the year one thousand eight hundred and fifty, between O. S., of Lyme, of the Srate of ————, father of E. B., a minor under the age of twenty-one years, of the one part, and A. K. of Newport, in the aforesaid State, of the other part, witnesseth:

That the said O. S. has placed and bound his son, E. P., an apprentice to the said A. K., to be instructed in the art, mystery of trade, and occupation of shoemaking, which the said A. K. now uses, and to live with him, and serve him as an apprentice, from the date hereof, until he, the said E. P., shall arrive at the age of twenty-

one years, which will be on the —— day of ——, A. D. —— ; all which time the said E. B. as an apprentice, shall faithfully serve, and be just and true to him, the said A. K., as his master; his secrets he shall keep, and his lawful commands obey; he shall do no injury to his master, in his person, family, or property, nor suffer it to be done by others; he shall not embezzle or waste his master's property, nor lend it without his consent; he shall not play at unlawful games, nor frequent taverns or tippling-houses; he shall not contract marriage, nor at any time leave his master's service without his consent; but in all things, as a good and faithful apprentice, he shall and will behave himself to his said master, during the time aforesaid. And the said A. K., on his part, in consideration of the premises, covenants and agrees with the said father and son, each by himself, respectively and jointly, to teach and instruct the said E. B., as his apprentice, or otherwise cause him to be well and sufficiently instructed and taught, in the art, mystery, trade, and occupation of shoemaking, in the best manner in his power, and to teach and instruct, or cause him to be taught and instructed, to read, to write, and to cipher as far as the first four rules of arithmetic; to educate him in the principles of religion and virtue, and train him to habits of faithfulness, industry, and economy.

And the said master shall and will provide for the said apprentice, meat, drink, washing, lodging, and apparel, in winter and summer, on common and holy days; and all necessaries, in sickness and in health, proper and convenient for an apprentice, during the time of his said apprenticeship; and at the expiration thereof, shall and will give to said apprentice—[here insert such articles as may be agreed upon between the parties].

In witness whereof, the parties have hereunto set their

hands and seals, as well as to a duplicate of the same tenor and date.

O. S. (L. S.)
E. B. (L. S.)
A. K. (L. S.)

Signed, sealed, and delivered, in the presence of M. O.
M. L.

Duplicates should be issued alike in all of their parts.

An indenture by a guardian of his ward may be in the same form as the above, only changing the word father for guardian. An indenture of this form will bind the father or guardian to a faithful performance of the covenant on the part of the apprentice, and will subject him to damages for his misconduct or non-performance. When the person binding an apprentice does not intend to make himseif liable on the indenture, but merely to give the power of a master over the apprentice, it may be so specified.

DEEDS.

All writings under the seal are deeds, but in common acceptation it is an instrument conveying lands.

A deed must be for a consideration.

The consideration may be money, goods, services, or marriage. Or the consideration may be love, natural affection, or connection by blood.

A deed must be written or printed. There must be sufficient parties.

There should be two witnesses to a deed in New Hampshire, Vermont, Rhode Island, Connecticut, Pennsylvania, Ohio, Georgia, Illinois, Indiana, Delaware, Tennessee, and North and South Carolina. In the other States one witness will answer.

It is required in some of the States, that the wife sign the deed, to free the estate from her right of dower.

There should be a seal of wax or wafer to each signature of a party to a deed.

In some of the States, a scroll of ink with a pen is of the same validity as a seal; but there must be evidence of an intention to substitute the scroll for a seal.

In Vermont, Rhode Island, and Connecticut, deeds are recorded by the town clerks of the several towns in which the lands lie. In other States they are recorded by recording officers, acting under various names.

In New Hampshire and Vermont a deed may be put on record before it is acknowledged, but it will be available only against the claims of creditors and subsequent purchasers for sixty days.

In most of the States a deed may be good against the grantor and his heirs, without being acknowledged or

recorded, but they will not avail against the attachment of a creditor, or the rights of a subsequent purchaser.

It is not generally safe to depart from accustomed usages in the wording of deeds.

Form of a Quit-Claim Deed.

Know all men by these presents, that we, O. S., of, &c., and D., the wife of the said N., in consideration of the sum of ———, to us in hand paid by O. P., of, &c., the receipt whereof we do hereby acknowledge, have bargained, sold, and quit-claimed, and by these presents do bargain, sell, and quit-claim, unto the said O. P., and to his heirs and assigns for ever, all our, and each of our right, title, interest, estate, claim, and demand, both at law and in equity, and as well in possession as in expectancy, of, in, and to all that certain farm, or piece of land, situate, &c. [describing it], with all and singular the hereditaments and appurtenances thereunto belonging.

In witness whereof, we have hereunto set our hands and seals, this —— day of ——, in the year ——.

Quit-Claim Deed with Covenant.

This indenture made the first day of January, in the year one thousand eight hundred and fifty, between O. N., of the city of Albany, county of ———, and State of New York, party of the first part, and J. N., of the town of ———, county of ———, and State of ———, party of the second part, witnesseth, that the said party

of the first part, for and in consideration of the sum of five thousand five hundred and fifty dollars, lawful money of the United States of America, to him in hand paid, by the said party of the second part, at or before the ensealing and delivery of these presents, the receipt whereof is hereby acknowledged, has remised, released, and quit-claimed, and by these presents does remise, release, and quit-claim, unto the said party of the second part, and to his heirs and assigns for ever, all [here describe land sold]; together with all and singular the tenements, hereditaments, and appurtenances, thereunto belonging, or in anywise appertaining, and the reversion and reversions, remainder and remainders, rents, issues, and profits thereof. And also, all the estate, right, , title, interest, property, possession, claim, and demand whatsoever, as well in law as in equity, of the said party of the first part, of, in, or to the above described premises, and every part and parcel thereof, with the appurtenances. To have and to hold, all and singular the above mentioned and described premises, together with the appurtenances, unto the said party of the second part, his heirs and assigns for ever. And the said party of the first part for himself, his heirs, executors, and administrators, does hereby covenant, promise, and agree, to and with the said party of the second part, his heirs and assigns, that he has not made, done, committed, executed, or suffered any act or acts, thing or things whatsoever, whereby, or by means whereof, the above mentioned and described premises, or any part or parcel thereof, now are, or at any time hereafter shall or may be impeached, charged, or encumbered, in any manner or way whatsoever.

In witness whereof, the said party of the first part has hereunto set his hand and seal, the day and year first above written.

O. N. (L. S.)

Sealed and delivered in the presence of V. S.

Form of Acknowledgment of Deeds in Maine, New Hampshire, Massachusetts, Vermont, Rhode Island, and Connecticut, by Husband and Wife.

Commonwealth [or, State] of ——, }
County of ——, *ss.* [town and date.] }

Then personally appeared the above named O. S., [and E. S., his wife, and severally] and acknowledged the foregoing instrument to be his [theirs] free act and deed; before me,

N. W.,
Justice of the Peace.

By a Person Conveying by a Power of Attorney.

Commonwealth [or, State] of ——, }
County of ——, *ss.* [town and date.] }

Then personally appeared the above named O. N., who signed and sealed the foregoing instrument as the attorney of the above named E. R., and acknowledge the same to be his free act and deed; before me,

J. N.,
Justice of the Peace.

Certificate of Acknowledgment of a Deed of Property in New York, the grantor being known to the Officer.

State of New York, }
Putnam County, *ss.* }

On this —— day of ——, in the year ——, personally appeared O. N, and acknowledged the within conveyance to be his act and deed, and I certify that I well know the said O. N., and that he is the same person who is described in the within conveyance, and who executed the same.

N. B., Commissioner of Deeds,
for said County of Putnam.

MORTGAGES.

A mortgage is the conveyance of property, subject to rights of redemption.

A mortgage made to secure the purchase-money, will take the preference of any other mortgage.

A mortgage on personal property, made to secure the payment of any money except the purchase-money, should be accompanied by the delivery of the goods to the mortgagee, and be followed by his continued possession of the property.

A mortgage on personal property may be available security, even if the possession of the property is not changed; provided the requirements of law are complied with, and there is no previous mortgage, and it can be made to appear that such mortgage was given for a valuable consideration, and without intent to defraud creditors.

All mortgages made with intent to defraud creditors are void.

Mortgages on personal property, where the possession is not changed, occasion innumerable suits at law.

In Maine, the property mortgaged, should be delivered to, and retained by the mortgagee, and the mortgage should be recorded in the office of the clerk of the town in which the mortgager resides.

In Massachusetts, Connecticut, and several other States, mortgages on personal property, when the mortgager retains possession, must be recorded by the clerk of the town where the mortgager resides, and in the town where he principally transacts his business.

In New York State, a mortgage on real property must be recorded in the clerk's office of the county where the

estate lies. And all mortgages, or a true copy thereof, on personal property, must be filed—if in the city of New York, in the office of the register; if in any other place in the State, in the town clerk's office where the mortgager resides. And all mortgages on personal property will cease to be valid after one year, unless within thirty days next preceding the expiration of the year, a copy of the mortgage is again filed.

In New Jersey, mortgages must be acknowledged, proved, and recorded, in the same manner as deeds.

The mortgager is entitled to redeem his property in New York, Pennsylvania, Connecticut, New Hampshire, &c. In Massachusetts, Rhode Island, and Maine, he has three years in which to redeem it.

Mortgage of Real Estate.

Know all men by these presents, That I, A. N., of ——, in the county of ——, and State of ——, yeoman, for and in consideration of —— dollars, paid by E. V., of ———, in the county of ———, merchant, the receipt whereof is hereby acknowledged, do hereby give, grant, bargain, sell, and convey, unto the said E. V., his heirs and assigns, for ever, a certain parcel of land situate in ———, in said county of ———, together with all the privileges and appurtenances to the same belonging, and bounded as follows:

[*Here insert the boundaries.*]

To have and to hold the above granted premises to the said E. V., his heirs and assigns, to his and their use

and behoof for ever. And I do, for myself, my heirs, executors, and administrators, covenant and engage to and with the said E. V., his heirs and assigns, that I am lawfully seized in fee simple of the afore-granted premises; that they are free from all incumbrances; that I have good right to sell and convey the same to the said E. W., his heirs and assigns; and that I will, and my heirs, executors, and administrators, shall, warrant and defend the same to the said E. V., his heirs and assigns, for ever, against the lawful claims and demands of all persons.

Provided nevertheless, That if the said A. N., his heirs, executors, administrators, or assigns, shall pay unto the said E. V., his executors, administrators, or assigns, the sum of ——— dollars, in —— years from the date hereof, then this deed, as also a certain promissory note bearing even date with these presents, given by the said A. N., to the said E. V., whereby he promises to pay the said sum at the time aforesaid, with interest semi-annually at the rate of six per centum, shall both be void to all intents and purposes, otherwise shall remain in full force and virtue.

In witness whereof, we, the said A. N., and U. B., wife of the said A. N., who hereby relinquishes all her right of dower in the above named premises, have hereunto set our hands and seals, this —— day of ——, in the year of our Lord one thousand eight hundred and fifty.

A. N. (L. S.)
E. B. (L. S.)

Signed, sealed, and delivered, in presence of

[Must be acknowledged and recorded.]

CERTIFICATES OF RENTING.

Tenant's Agreement in Common Use.

This is to certify, that I have hired and taken from B. D., all that certain brick store in the city of New York, on the east side of Nassau street, No. —, now occupied by O. L. as a book and periodical store, for the term of one year from the first day of January, 1851, at the yearly rent of one thousand dollars, payable in quarterly payments, to be made on the first day of April, July, October, and January.

And I hereby promise to make punctual payment of the rent in manner aforesaid, and quit and surrender the premises at the expiration of the said term, in as good state and condition as reasonable use and wear thereof will permit, damages by the elements excepted, and engage not to let or underlet the whole or any part of the said premises, or occupy the same for any business deemed extra-hazardous on account of fire, without the written consent of the landlord, under the penalty of forfeiture and damages.

Given under my hand and seal, the first day of January, 1851.

O. W. N. (L. S.)

Landlord's Agreement in Common Use.

This is to certify, that I have let and rented unto S. S., all that certain brick store in the city of Brooklyn, on the east side of Fulton street, No. —, now occupied by

E. S., as a book and periodical store, for the term of one year from the first day of January, 1851, at the yearly rent of one thousand dollars, payable in quarterly payments, to be made on the first days of April, July, October, and January. The premises are not be used or occupied for any business deemed extra-hazardous on account of fire, nor shall the same, or any part thereof, be let or underlet, without the written consent of the landlord, under the penalty of forfeiture and damages.

Given under my hand and seal, the first day of January, 1851.

P. A. (L. S.)

FEES PAYABLE AT THE PATENT OFFICE.

If a citizen of the United States, as a patent-fee	$30 00
If a foreigner, who has resided in the U. States one year next preceding the application for a patent, and shall have made oath of his intention to become a citizen - - -	30 00
If a subject of the sovereign of Great Britain	500 00
All other foreigners - - -	300 00
On entering an application for an appeal from the decision of the commissioner -	25 00
On extending a patent beyond fourteen years	40 00
For adding to a patent the specification of a subsequent improvement - -	15 00
In case of reissue, for every additional patent	30 00
On surrender of an old patent to be reissued, or correct a mistake of the patentee -	15 00
For a disclaimer - - - -	10 00
For a design patent - - -	15 00

GOLD COINS.

	$ cts.
United States Eagle, since 1834	10 00
United States Eagle, before 1834	10 43
United States Half Eagle	5 00 to 5 22
United States Quarter Eagle	2 50 to 2 61
Doubloon, Mexico	15 46 to 15 60
Doubloon, Spain, 1802	15 90
Doubloon, Chili, 1841	15 55
Doubloon, Bolivia, 1839	15 60
Doubloon, Peru, 1827	15 60
Doubloon, New Granada	15 60
Doubloon, Central America	15 60
Half Doubloon, Bolivia, 1836	7 75
Quarter Doubloon, Chili, 1840	3 80
Quarter Doubloon, Peru	3 80
Quarter Doubloon, Colombia	3 80
Quarter Doubloon, Bolivia, 1835	3 80
Guinea	5 00
Half Guinea	2 50
Seven Shilling Piece	1 70
Sovereign	4 80 to 4 84
Double Louis, France, before 1786	7 20
Double Louis, France, since 1786	9 02 to 9 12
Double Louis, Malta	9 23
Louis, France, 5 pwts. and 5 3-4 grs.	4 63

	$ cts.
Louis, France, 4 pwts. and 22 grs.	4 56
Louis, Malta	4 64
Demi Louis, Malta	4 33
Forty Francs	7 67
Twenty Francs	3 83
Ducat, Frankfort	2 26
Ducat, current, Denmark	1 80
Ducat, specie, Denmark	2 25
Ducat, Cologne	2 25
Ducat, Bern	2 00
Ducat, Hungary	2 29
Ducat, Holland	2 26
Ducat, Hanover	2 28
Ducat, Brunswick	2 24
Ducat, Hamburg	2 25
Ducat, Sweden	2 23
Ducat, Saxony	2 23 to 2 25
Ducat, Russia, 1763	2 25
Ducat, Russia, 1796	2 28
Six Ducat Piece, Naples, 1783	5 22
Two Ducat Piece, Naples, 1762	1 59
Three Ducat Piece, Naples, 1818	2 48
Ducat, Prussia	2 25 to 2 27
Ducat, Poland	2 26
Ducat, Wurtemburg	2 22
Wurtemburg	4 87
Pistole, old, Geneva	3 96
Pistole, New, Geneva	3 40
Pistole, Brunswick	4 53

	$ cts.
Pistole, Bern	4 51
Pistole, Parma	4 10 to 4 18
Pistole, Spain, 1801	98
Gold Florin, Hanover	1 65
George d'or, Hanover	3 97
Christian d'or, Denmark	4 00
Seguin, Tuscany	2 28
Seguin, Turkey	1 81 to 1 85
Forty Line Piece, Milan, 1808	7 45
Seguin, Milan	2 27
Seguin, Rome, since 1748	2 23
Seguin, Piedmont	2 27
Gold Ruble, Russia	73 to 96
Imperial, Russia, 1801	7 78
Half Imperial, Russia, 1808	3 91
Five Thalers, Germany, 1825	3 90
Ten Guilders	4 00

SILVER COINS.

	$ cts.
United States Dollar	1 00
Mexican Dollar	1 00
Mexican Real	12
English Crown	1 09 to 1 21
English Half Crown	60
English Shilling	23
English Sixpence	11
Quarter Franc	4

	$ cts.
Half Franc	8
One Franc	17
Two Francs	34
Five Francs	93 to 95
French Crown	1 06
One Livre	1 07
Base Dollar, Colombia	70
Base Dollar, New Granada	65
Spanish Dollar	1 00 to 1 01
Spanish Real	12
Cross Pistareen	16
Dollar, La Plata	90
Dollar, Colombia	1 00
Quarter Dollar, Chili	23
Two Reals, Ecuador	13
Quarter Dollar, Guatemala	22
Dollar, Peru	1 00
Two Reals, Central America	23
Dollar, Bolivia, 1838	1 00
Half Dollar, Bolivia, 1830	48
Rupee, 1835	40
Crown, Tuscany	97
Scudo, Naples	94
One Guilder, Holland	36
Rix Dollar	92 to 96
One Thaler, Germany	66
Rix Dollar, 1812	66
Dollar, Hungary	93
One Guilder, Germany	37

DIRECTIONS FOR FARMING.

ELEMENTS

OF

PRACTICAL AGRICULTURE.

SOILS.

EXTERNAL CHARACTERISTICS.

THE Soil is the upper portion of the ground in which plants are produced. It forms a stratum of from a few inches to a foot or more in depth. It is usually somewhat dark in color, arising from the mixing with it of the decomposed stems, leaves, and other parts of plants which had grown upon it, and in part often from the presence of animal substances. The decomposed organic portion of the soil may be termed *mould;* mould distinguishes the soil from the subsoil.

Soils are termed rich or poor: with relation to their texture, they may be termed stiff,—and free or light.—The stiff soils are those which are tenacious and cohesive in their parts; the light or free soils are those which are of a looser texture, and whose parts are easily separated.

All soils which possess this cohesive property in a con-

siderable degree, are termed *clays;* while all the looser soils are termed *light* or *free.*

When soils are naturally fertile, or rendered permanently so by art, they are termed *loams.*

Subsoils are distinguished from soils by the absence of mould.

Soils may be distinguished according to their texture and constitution, and they may be divided into two classes,—the stiff or strong, denominated Clays,—the light or free, subdivided into the Sandy, Gravelly, and Peaty; and all these, again, may be distinguished,

1*st*, According to their powers of production, when they are termed Rich or Poor; and

2*d*, According to their habitual relation with respect to moisture, when they are termed Wet or Dry.

THE PROPERTIES OF SOILS AS DETERMINED BY CHEMICAL ANALYSIS.

Soils consist chiefly of silica, alumina, lime, magnesia, oxide of iron, potassa, and soda, together with a portion of matter derived from organic substances.

The soil, then, may be chiefly regarded,

1*st*, As the instrument for fixing the roots of plants in the ground; and,

2*d*, As a medium for conveying to them the water holding dissolved the different substances which pass into the plant.

The order in which the principal substances that enter into the composition of soils possess an absorbent power, is the following:

1. Animal and vegetable substances.
2. Alumina.
3. Carbonate of Lime.
4. Silica.

The following conclusions may be given as deducible from the investigations of chemists:

1. Soils, in which a large quantity of silica and alumina

exists in the state of fine divisions, are comparatively fertile.

2. Soils in which the quantity of siliceous sand is large are comparatively infertile; while soils in which the sand is fine and only partially siliceous, are comparatively fertile.

3. Iron exists in all soils, but does not influence their fertility in proportion to its larger or smaller quantity.

4. An excess of the acid combinations of the oxide of iron, and certain other saline bodies, is hurtful to vegetation.

5. Carbonate of lime exists in the best soils, and, generally, though not always, in larger quantity in the better than in the inferior soils.

6. Certain earths possess the power of combining chemically with animal and vegetable matter, and of retaining it for a longer or shorter time. Thus, alumina and lime form certain compounds of greater or less insolubility with animal and vegetable matters, while silica will not enter into the same combinations; and hence it is that aluminous and calcareous soils retain for a longer time the manure applied to them than siliceous soils.

7. When water is in excess in the soil, and when vegetable matter is present, acid is formed which is injurious to the productive powers of the soil. Farmers are familiar with this effect, and say that the soil is soured.

8. Soils, besides absorbing moisture from the air, appear to absorb carbon and other matters nutrimental to plants.

MEANS OF INCREASING THE PRODUCTIVE POWERS OF SOILS.

1. Supply the soil with those organic and earthy substances which may be required.

2. Alter its texture, depth, and properties, by tillage and other means.

3. Change its relation with respect to moisture.
4. Change its relation with respect to temperature.

MANURES.

There are,—

1. Animal and Vegetable Manures.
2. Mineral Manures.
3. Mixed Manures.

Lime may be applied to the land thus:

1. It may be laid on the surface of land which is in grass, and remain there until the land is ploughed up for tillage. Lime, in this case, quickly sinks into the soil, and acting upon it, prepares it for crops when it is again tilled.
2. It may be spread upon the ground, and covered by the plough, just after a crop of any kind has been reaped.
3. It may be spread upon the surface even when plants are growing.
4. It may be, and is most frequently, applied during the season in which the land is in fallow, or in preparation for what are termed fallow crops.
5. It may be mixed with earthy matter, particularly with that containing vegetable remains; forming a compost.

IMPLEMENTS OF THE FARM.

1. Implements for preparing land for plants to be cultivated. These may be called the Implements of Preparatory Tillage:

1. The Plough.
2. The Harrow.
3. The Roller.

2. Machines for Sowing:

1. Corn in rows.

2. Corn and Grass-seeds broad-cast.
3. The Seeds of the Bean and Pea.
4. The smaller Seeds in rows.

3. Implements for Hoeing.

   Horse-Hoes, &c.

4. Machines for Thrashing and Winnowing.
   1. Thrashing-Machine.
   2. Winnowing-Machine.

5. Implements for preparing food for live-stock.
   1. Turnip-slicer.
   2. Chaff-cutter, &c.

6. Wheel-carriages.
   1. Single and Double-horse Cart, or Wagon.
   2. Sparred or Corn-cart.

7. Utensils of Dairy.
   1. Churn.
   2. Cheese-press, &c.

8. Implements of Manual Labor, &c.

   Barrows, Forks, Spades, Shovels, &c.

PLOUGHING.

The medium depth of good ploughing may be held to be seven inches. When circumstances, as the kind of crop and the nature of the soil, do not require deep ploughing, the depth may be less.

The common calculation, where good ploughing is practised, is, that a pair of horses will plough an acre when in grass in nine hours. In very stiff soils less will be done; and in very light soils, more.

DRAINING.

Principles to be ever kept in mind by the tillage-farmer are to keep his land dry, rich, and clean.

In open drains, of whatever depth, the sides should

possess a declivity from the top to the bottom, to prevent them from crumbling down and being undermined by the current.

When drains of this class are covered, they are genally made from two and a half to three feet deep, and filled with stones or other loose materials to within a foot of the surface.

SUCCESSION OF CROPS.

The experience of husbandmen from the earliest times has shown, that the same kinds of plants cannot be advantageously cultivated in continued succession. The same or similar species tend to grow feebly, or degenerate, or become more subject to diseases, when cultivated successively upon the same ground.

All herbaceous plants, when cut in their green state, that is, before they have matured their seeds, exhaust the soil less than when they remain until they have ripened their seeds.

GOOD RULES.

1*st*, Crops consisting of plants of the same or similar species, should not follow in succession, but should return at as distant intervals as the case may allow.

2*d*, Crops consisting of plants whose mode of growth or cultivation tends to the production of weeds, should not follow in succession.

3*d*, Crops whose culture admits of the destruction of weeds, should be cultivated when we cultivate plants which favor the production of weeds.

And, 4*th*, when land is to be laid to grass, it should be done when the soil is fertile and clean.

When we find that land requires rest, we may lay it down to grass for a longer or shorter time, taking care when this is done, that the land shall be in as fertile a state as circumstances will allow, and free of weeds.

EXAMPLE.

1st year, Turnips or other green crop, manured.

2d " Grain-crop, as wheat, barley, or oats.
3d " Sown grasses.
4th " Grain-crop.

In this course, we observe that each exhausting crop alternates with a restorative one; and that, in each year, one-half of the farm is under exhausting, and one-half under restorative, crops.

CULTIVATION OF PLANTS.

I. PLANTS CULTIVATED FOR THEIR SEEDS.

I. Cereal Grasses.

Of the cereal grasses, those most commonly cultivated in this country are wheat, rye, barley, and oats.

The seeds of these cereal grasses may be sown either previously to winter or in spring; wheat and rye are, for the most part, sown before winter; barley and oats generally in the spring.

In the end of summer, when the green color of the stem has nearly disappeared, and when the grain, having changed from its milky state, has somewhat hardened, it will be proper to commence the process of reaping.

WHEAT.

The following species may be enumerated as admitting of cultivation for their seeds:

Summer Wheat.
Winter or Lammas Wheat.
Compact Wheat.
Egyptian Wheat.
Turgid Wheat.
Dark-spiked Wheat.
Barley-like Wheat.
Far.
Spelt.

One-grained Wheat.
Polish Wheat.

The most important in the rural economy of this country is the winter-wheat.

Winter-wheat is sometimes termed spring-wheat.—This merely arises from the period of sowing. If it is sown in spring, it is termed spring-wheat; if previous to winter, Lammas or winter-wheat.

Wheat is of very general cultivation on all classes of soils; but the soils which are best suited to it, are those which are more or less clayey.

Wheat is subject to various accidents and diseases, some of them peculiar to itself. The most dreaded and destructive of these is *blight* or *mildew*.

This disease is indicated by the presence of certain minute plants of the order of *Fungi*, or the mushroom tribe, which grow upon the stem and leaves, and doubtless feed upon and exhaust the juices of the plant.

One of this tribe of plants, and apparently the most destructive, is *Puccinia graminis*, which appears in the form of small spots upon the stem, and gradually extends in lines on the surface.

A disease termed *rust* is also very frequent and hurtful. It appears in the form of a brownish dust upon the stem and leaves; and it is produced likewise by a parasitical plant of the same family.

Another disease of wheat, produced also by minute fungous plants, is *smut*.

Farmers, when their wheat is greatly injured by this disease, sometimes wash it, by immersing it in vats or cisterns partly filled with water. The smut-balls and lighter grains floating to the surface are skimmed off, and the heavy and sound grain after being washed, is exposed to the air to dry, or dried in a kiln with a moderate heat.

Certain flies also attack the wheat, at a later stage of its growth. The *Cecidomyia Tritici* is a fly with an orange-colored body and white wings. About the month of June the female ascends the ears of wheat, and de-

posites her eggs in these by means of a fine trunk, and in a few days she perishes. The progeny being hatched in the ear, feed upon the grain. They are very small, from ten to fourteen being sometimes found in one grain, and are distinguished by being of a bright orange-color.

When stored in the granary it is subject to the attacks of the weevil and other creatures.

RYE.

It stands drought better than wheat, but is more apt to suffer injury from wetness. It is a hardier plant than wheat, and less subject to the attacks of insects and diseases.

Rye, though free from the diseases of wheat, is yet subject to a peculiar one. This is the ergot, a fungous plant, which, though it is found on other gramineous plants, is more especially the disease of rye. It is a long cartilaginous-like substance, taking the place of the grain, and projecting from the ear. It chiefly prevails in humid seasons, in close situations, or where the soil is wet.

BARLEY.

Of the genus *Hordeum*, the following species may be enumerated as cultivated for their seeds:

Two-rowed Barley.
Two-rowed Naked Barley.
Two-rowed Sprat or Battledore Barley.
Six-rowed Barley.
Six-rowed Naked Barley.
Six-rowed Sprat or Battledore Barley.

The diseases of barley are not so numerous or fatal as those of wheat. It is attacked by the larvæ of certain flies. It is also subject to smut, though in a partial degree, and the fungous is usually *Uredo segetum*.

OATS.

KINDS.

Bristle-pointed Oat.
Short Oat.
Common Oat.
Tartarian Oat.
Naked Oat.

Avena sativa, Common oat, is the most important of the cultivated species.

MAIZE.

The proper method of cultivating it is in rows at the distance from one another of from 3 to 4 feet.

It is easily injured by frosts.

It is a perfectly nutritious substance.

The maze is a nourishing food for all the domestic animals. It is suited to the feeding of the horse: hogs get speedily fat upon it, and poultry eagerly eat the hard grains.

LEGUMINOUS PLANTS.

THE BEAN.

The bean is of the genus *Faba*, of which there is reckoned one species—

Faba vulgaris—Common Bean.

There are two general classes,—those which are cultivated in the fields, and are thence termed field-beans, and those which are cultivated in gardens, and so termed garden-beans.

Of the white or garden beans, the sorts are very numerous.

The Long-podded are of the middle size of garden-beans, and there are many varieties enumerated by gardeners.

Beans should follow a corn-crop.

It is a frequent practice to mix a quantity of peas with beans, generally in the proportion of about half a bushel to the acre.

The straw of the bean is nutritious and wholesome. It is generally given to horses, and is reckoned little inferior to hay.

The most common disease of the bean is a species of rust, produced by parasitic plants of mushroom family, growing upon it in the same manner as rust or mill-dew on wheat.

The animals that attack and feed upon the juices of the bean are certain aphides, the most common of which is of a bluish-black color, and is called the *collier.* In some seasons this creature is very destructive. It begins at the top of the plant and continues multiplying downwards. A remedy, which has been suggested and practised, is to cut off the top of the plants as soon as the aphides appear; and this may be a palliative if carefully performed.

THE PEA.

Of the cultivated Pea there seems to be but one species, comprehending our various cultivated kinds, whether grown in the garden or the field, namely:

Pisum sativum—Cultivated Pea.

Early hoeing in the case of this plant should never be neglected.

BUCKWHEAT.

Polygonum Fagopyrum—Common Buckwheat.

The soils suited to it are the lighter kinds.

The seeds of the buckwheat may be given advantageously to horses, to poultry, and to hogs. Converted into flour it makes most excellent cakes.

THE TURNIP

The common turnip has numerous sorts, distinguished by their size, form, time of ripening, and other properties.

1. The round or globular; 2. The depressed; and, 3. The fusiform.

The insect most destructive to the turnip during the first stage of its growth, is the turnip-fly. It is a species of beetle. This creature attacks the plant as soon as the cotyledon leaves are upon it; when the plants have put on the second or rough leaves, they are regarded as safe from injury from the beetle, and hence a security against its ravages is a rapid and vigorous vegetation of the plant.

There are other creatures that attack the plant at this stage, and when it has escaped these early enemies, it is sometimes attacked by the larvæ of a species of saw-fly.

CABBAGE.

The kinds of the cabbage which are best suited to general cultivation in the fields are the large-headed cabbages.

The proper method, however, of cultivating the cabbage is to sow the seeds of it in the first place in beds, and then transplant it.

THE POTATO.

This plant, of the genus *Solanum*, is of the natural order *Solaneæ*, or the Night-shade tribe.

Of all the species, the most important to the human race is—

Solanum tuberosum—the Tuberous-rooted Night-shade, or Potato.

The soils best adopted to the potato are of the drier and lighter class.

The potato requires a large supply of manure. The quantity should be from 16 to 20 tons to the acre.

The starch or fecula of the potato may be obtained separately by simple means, and applied to various purposes of domestic economy.

The accidents and diseases to which this plant is subject are, happily, not many, nor, in this country at least, very formidable. We are not much troubled with the *rot*.

THE CARROT.

The most esteemed for field-culture are the Orange, and the Long-red.

The Carrot, from its long fusiform root, requires a deep soil. It prefers the sandy, and rejects the stiff clays.

The seeds of the carrot should be of the previous season's growth.

Carrots may be given to every species of stock, and they form in all cases a palatable and nutritious food.

THE PARSNIP.

The seeds of the parsnip may be sown either in autumn or in spring.

The seeds must be new.

All animals are fond of the parsnip. To milch cows it is eminently favorable, giving a flavor and richness to the milk.

THE BEET.

The field-beet, *Beta vulgaris*, is of larger size, and grows more above ground, than the garden kinds.

It differs from the turnip in this, that it may be grown on stiffer soils.

FLAX.

The most important of the genus is—

Linum usitatissimum—Common Flax.

The soils best suited to flax are those which contain a large proportion of vegetable matter.

SUGAR.

The Sugar-maple, *Acer saccharinum*, is one of the innumerable marvels of the American forest. The juice, which continues to flow for five or six weeks, is conveyed to a trough at the foot of each tree, and collected every day, and poured into casks, from which it is drawn to fill the boilers, which are upon the spot. It is then evaporated by means of a brisk fire, until the liquid is reduced to a syrup, when it is left to cool, and it is then strained through woollen cloth, to separate the impurities. It is boiled a second time, until it is of a proper consistency to be poured into moulds. The sugar obtained in this manner is equally grateful to the taste as the brown sugar derived from the sugar-cane.

PLANTS CULTIVATED FOR THEIR FRUITS.

These are,—

The Vine.

The Apple, and others of the Apple tribe; as the Pear, the Medlar, and the Quince.

The Peach and others of the Almond tribe, as the Plum, the Apricot, and the Cherry.

The Strawberry and other fruit-bearing plants of the Rose family; as the Raspberry, and others.

The Gooseberry, and others of the Currant tribe.

The Pumpkin, and others of the Gourd tribe.

The Hazel, and others of the Oak tribe; as the Oak, the Chestnut, and the Beach:—Juglans regia, the Walnut; and other trees and shrubs bearing nuts and berries.

MANAGEMENT OF GRASS LANDS.

FORAGE.

The clovers and similar leguminous plants mixed with grasses, may be applied alike to forage and to herbage.

There is no period in the growth of these plants, at which they will afford so early and rich an herbage, as when they are one-year old grass.

In stacking, some recommend the strewing of salt upon the hay, as the building of the stack proceeds.

The grasses to be mown are cut down when the greater number of them have come into flower.

PASTURAGE.

A primary improvement of which lands unsuited to cultivation are susceptible, is freeing them from stagnant water.

A rule of the farm is to put sheep on finer and shorter grasses in preference to cattle and horses, and cattle and horses upon the larger and ranker pastures.

The chief injury which land when left long in grass is apt to sustain, is the decay of its herbage by the springing up of inferior plants. The most common of these are the *Musci*, Mosses.

The best method of destroying this class of plants is by draining and liming.

RESULTS

OF THE INVESTIGATIONS OF

PROFESSOR LIEBIG, SIR HUMPHRY DAVY,

AND OTHERS, ON

PRODUCTIVE FARMING.

NECESSARY RELATION BETWEEN THE COMPOSITION OF A SOIL AND THE VEGETABLES IT IS FITTED TO RAISE. FALLOWING AND GREEN CROPS CONSIDERED AS VEGETABLE MANURE.

Besides heat, light, moisture, and the component elements of the atmosphere, which are necessary for the mere existence of all plants, certain fertilizing substances are seen to exercise a peculiar influence over the development either of whole plants, or of particular parts of them. Such substances are either already contained in soil, or may be artificially supplied in the form of manure.

The rules of a rational system of agriculture should enable us, therefore, to give to each plant that which it requires for the attainment of the special object in view —namely, an artificial increase of certain parts which are employed as food for man and animals.

The means employed for the production of fine pliable straw for hats and bonnets is the very opposite to the mode which must be adopted, in order to produce the

largest possible quantity of corn from the same plant.—Peculiar methods must be used for the production of nitrogen in the seeds; others for giving strength to the straw; and others again, when we wish to give such qualities to the straw as will enable it to bear the weight of the ears.

We must proceed in the artificial rearing and forcing of plants precisely as we do in the fattening of animals. The flesh of wild animals is devoid of fat, or nearly so. The production of flesh and fat may be artificially increased: all domesticated animals are easily fattened.—To do this, we add to the quantity of food, and lessen (as in the stall-fed ox) the waste occasioned by the increased action of the lungs, (as consequent upon motion,) together with the waste which such muscular exertion would produce by increased action of the skin.

Arable land is originally formed by the crumbling of rocks, and its properties depend on the nature of its component parts.

Sand, clay, and lime, are the names given to the principal constituents of the different kinds of soil.

Pure sand, and pure limestone, in which there are no other unorganized substances except the earth of flint, chalk, or silicic acid combined with lime, form absolutely barren soils. But clay always forms a part of fertile soils. Whence is the origin of clay earths in arable land? What are their constituents? and what part do they play in favoring vegetation? They are produced by the breaking down of aluminous minerals by the action of the weather. These minerals are found, mixed with other substances, in granite, mica-slate, porphyry, clay slate, the volcanic rocks, and others. Mountain limestone is remarkable for the quantity of clayey earths which it contains. In grauwacke we find pure quartz, clay slate, and lime; in the sandstones, quartz and loam; and in the transition limestone there is an intermixture of clay, feldspar, and clay slate. These examples may be sufficient.

It is known that aluminous minerals (that is to say, minerals containing the metal "aluminum," which, com-

bined with oxygen, forms "alumina," or the pure earth of clay) are the most widely diffused on the surface of the earth; and all fertile soils, or soils capable of culture, invariably contain alumina.

There must, therefore, be something in aluminous earth which causes it to exercise an influence on the life of plants, and to assist in their growth. The property on which this depends is, that clay invariably contains potash and soda. Besides which, alumina attracts and retains water and ammonia from the atmosphere. Alumina is itself very rarely found in the ashes of plants; but silica (or the earth of flints) is always present, having, in most places, entered the plants by means of alkalies. Among aluminous minerals, feldspar, which is one of them, contains 17 per cent. of potash; mica from 3 to 5 per cent. of soda: clay slate contains from 2 to 3 per cent. of potash; and loam from 1 1-2 to 4 per cent. of the same alkali.

So that, in a layer of soil formed by the breaking down of 40,000 square feet of one of these rocks, to the depth of 20 inches, we should find that so much feldspar would contain more than a million pounds of potash; if the soil were formed by the disintegration of clay slate, about 200,000; if loam were the material, from 87,000 to 300,000; and similarly of other rocks of partially aluminous character.

Potash is present in all clays, and in marl; it has been found in all aluminous earths in which it has been sought. Alum (which is a sulphate of alumina, combined with sulphate of potash) may be procured by digesting clay in sulphuric acid, which takes up both the alumina and the potash.

A thousandth part of loam mixed with the quartz in red sandstone, or with the lime in the different limestone formations, affords as much potash to a soil twenty inches in depth as is sufficient to supply a forest of pines growing upon it with potash for a hundred years.

Water, impregnated with the carbonic acid of the atmosphere, decomposes rocks which contain alkalies, and then dissolves a part of the alkaline carbonates formed

in the process. Plants, also, by producing carbonic acid during their decay, and by means of the acids emitted by their living roots, contribute no less powerfully to destroy the coherence of solid minerals. Air, water, and changing temperature prepare the different species of rocks for yielding to plants the potash or soda they contain.

Changing temperature is a most important agent in nature. It not only assists in the original formation of soils, but exerts a most powerful influence over those already in existence. In wet soils the temperature rises slowly, and never attains the same height as in one that is sandy and dry. When the heat of the atmosphere rises no higher in the shade than 60 or 70 degrees, a dry soil may become so warm as to raise the thermometer to 90 or 100. Hence, though the expression be used figuratively, it is in this instance strictly correct to say that wet soils are cold.

The exhaustion of alkalies in a soil by successive crops is the true reason why practical farmers suppose themselves compelled to suffer land to lie fallow. It is the greatest possible mistake to think that the temporary diminution of fertility in a field is chiefly owing to the loss of the decaying vegetable matter it previously contained: it is principally the consequence of the exhaustion of potash and soda, which are restored by the slow process of the more complete disintegration of the materials of the soil. It is evident that the careful tilling of fallow land must accelerate and increase this further breaking up of its mineral ingredients. Nor is this repose of the soil always necessary. A field, which has become unfitted for a certain kind of produce, may not, on that account, be unsuitable for another; and upon this observation a system of agriculture has been gradually formed, the principal object of which is to obtain the greatest possible produce in a succession of years, with the least outlay for manure. Because plants require for their growth different constituents of soil, changing the crop from year to year will maintain the

fertility of that soil (provided it be done with judgment) quite as well as leaving it at rest or fallow.

In practical farming, one crop in artificial rotation with others, extracts from the soil a certain quantity of necessary inorganic matters; a second carries off, in preference, those which the former had left, and neither could nor would take up.

Experience proves that wheat should not be attempted to be raised after wheat on the same soil; for, like tobacco, it exhausts the soil. But if decaying vegetable mattter, gives it the power of producing how happens it that, in soils formed in large proportion of mouldered wood, the corn-stalk attain no strength, and droops permanently? The cause is this; the strength of the stalk is due to silicate of potash, and the corn requires phosphate of magnesia; neither of which substances a soil of decaying vegetable matter can afford, since it does not contain them: the plant may, indeed, under such circumstances, become an herb, but it will bear no seeds. We say phosphate of magnesia is necessary;—the small quantities of the phosphates found in peas and beans is the cause of their comparatively small value as articles of nourishment, since they surpass all other vegetable food in the quantity of nitrogen they contain. But as the component parts of bone, namely, phosphate of lime and magnesia, are absent in beans and peas, they satisfy appetite without increasing the strength.

Again, how does it happen that wheat does not flourish on a sandy soil, and that a limestone soil is also unsuitable, unless mixed with a considerable quantity of clay? Evidently because these soils do not contain potash and soda, (always found in clay;) the growth of wheat being arrested by this circumstance, even should all other requisite substances be presented in abundance. It is because they are mutually prejudicial by appropriating the alkalies of the soil, that wormwood will not thrive where wheat has grown, nor wheat where wormwood has been.

One hundred parts of wheat straw yield 15 1-2 of

ashes; the same quantity of barley straw, 8 1-2; of oat straw, only 4; the ashes of the three are, chemically, of the same composition. Upon the same field which will yield only one harvest of wheat, two successive crops of barley may be raised, and three of oats. We have, in these facts, a clear proof of what is abstracted from the soil, and, consequently, what plants require for their growth,—a key to the rational mode of supplying the deficiency.

Potash is not the only substance requisite for the existence of most plants; indeed, it may be replaced, in some cases, by soda, magnesia, or lime; but other substances are required also.

Plants obtain phosphoric acid (found in combination with lime or magnesia) from the soil, and they, in their turn, yield it to animals, to assist in the formation of their bones. Creatures that feed upon flesh, bread, fruit, and husks of grain, take in much more phosphorus than is required for the building up of the animal fabric; and this excess is again usefully thrown out by them, chiefly in their liquid excrements. Some plants, however, extract other matters from the soil besides silica, potash, and phosphoric acid, which are essential constituents of the plants ordinarily cultivated.

American farming presents us with varied instances of plants sown, and growing together in the same field. Two such vegetables will mutually injure each other, if they withdraw the same food from the soil.—Plants will thrive beside each other, either when the substances necessary for their growth, extracted from the soil, are of different kinds, or when they themselves are not both in the same stage of growth at the same time. On a soil containing potash, wheat and tobacco may be reared in succession, because the latter plant does not require the phosphates which the wheat has appropriated to itself. Now, tobacco requires only alkalies, and food containing nitrogen. When we grow different plants in the same soil, for several years in succession, the first of which leaves behind that which the second, and the second that which the third may require, the

soil will be a fruitful one for all the three kinds of produce. If the first plant, for example, be wheat, which consumes the greatest part of the silicate of potash in the soil, the plants which succeed it should be such as require little potash, as turnips or potatoes. The wheat lands may be sown again with wheat, advantageously, after the fourth year. The reason of this is, that during the interval of three years, the soil will, by the action of the atmosphere, be rendered capable of again yielding silicate of potash in sufficient quantity for wheat. Whether this process can be artificially anticipated, by supplying the exhausted ingredient to the soil, is a further, and most interesting inquiry.

In a four-years' course of cropping, the crops gathered amounted, per acre, to—

1st year, *Turnips*, 25 tons of bulbs, and 7 tons of tops.

2d year, *Barley*, 38 bushels, and a ton of straw.

3d year, *Clover* and *Rye Grass*, 1 ton of each in hay.

4th year, *Wheat*, 25 bushels, and 2 tons of straw.

Supposing none of the crops to be eaten upon the land, the quantity of inorganic matter contained in the above would be as follows:—

	lbs.		lbs.	
Potash,	281	Silica,	318	
Soda,	130	Sulphuric acid,	111	in combination
Lime,	242	Phosphoric acid,	61	with the earths
Magnesia,	42	Clorine,	39	and alkalies;
Alumina.	11			

making a gross weight of 1240 pounds, or about eleven hundred weight.

A still clearer idea of the importance and quantities of these organic matters, may be obtained by a consideration of the fact, that if we were to carry off the entire of the above produce, and return none of it again in the shape of manure, (supposing also that we could stop the

benefical agency of the atmosphere during that period,) we must, or ought, instead of that produce,—if the land is to be restored to its original condition,—add to each acre, every four years, 300 pounds of pearl ashes, or potash; 440 of carbonate of soda; 65 of common salt; 240 of quick lime; 250 of sulphate of magnesia, that is, Epsom salts; 84 of alum; and 260 bone dust; making 1729 pounds of solid saline matter.

The fertility of a soil cannot remain long unimpaired, unless we replace in it all those substances of which it has been deprived. We could keep our fields in a constant state of fertility, by replacing, every year, as much as we remove from them in the form of produce; and, be it remembered, that our cultivated corn plants, and bulbous roots, are not like forest plants and trees: the quantity of nutriment they require, and take up, to bring them to perfection and perpetuate the race, is far more than the unaided elements around them could supply. Wheat, for instance, as a natural production of the soil, appears to have been a very small grass; and the case is still more remarkable with the apple and the plum. The common crab seems to have been the parent of all our apples. Potatoes and turnips, in their wild or natural state, are unfit for food; and two fruits can scarcely be conceived of more different in color, size, and appearance, than the wild plum and the rich magnum bonum. We have to contend, then, with two important differences: First, That wheat or turnips are not natural productions; and, secondly, That because they are not, they drain or exhaust unassisted soil faster than the wild plants of the forest; nor will they thrive long, if denied that assistance from artificial nutriment, which nature cannot supply in sufficient quantity.

It is evident, then, that an increase of fertility, and consequent increase of crop, can only be expected when we add more to the soil of the proper material, (and no other,) than we take way. And soil will partially regain itself by lying fallow: this is owing to atmospheric action, and the conversion of the roots and stalks into humus. But though the quantity of decaying vegeta-

ble humus in a soil may be increased to a certain degree by cultivation and alternate cropping, still there cannot be the smallest doubt, that a soil must (without help) ultimately lose those of its constituents, which are removed in the seeds, roots, and leaves of the plants raised upon it.

To prevent this loss, and, as a further object, to enable us to raise increased quantities of productions, demanding more sustenance than the land will naturally yield, is the object of the application of the various substances used as MANURES. They will prove useless, injurious, or valuable, precisely as they are accurately or inaccurately adapted to meet the deficiency.

Land, when not employed in raising food for animals or man, should, at least, be applied to the purpose of raising manure for itself; and this, to a certain extent, may be effected by means of green crops, which, by their decomposition, not only add to the amount of vegetable mould contained in the soil, but supply the alkalies that would be found in their ashes. That the soil should become richer by this burial of a crop, than it was before the seed of the crop was sown, will be understood by recollecting that three-fourths of the whole organic matter buried has been derived from the air: that by this process of ploughing in, the vegetable matter is more equally diffused through the whole soil, and therefore more easily and rapidly decomposed; and that by its gradual decomposition, ammonia and nitric acid are certainly degenerated, though not so largely as when animal matters are employed. He who neglects the green sods, and crops of weeds that flourish by his hedgerows and ditches, overlooks an important natural means of wealth. Left to themselves, they ripen their seeds, exhausting the soil, and sowing them annually in his fields: collected in compost heaps, they add materially to his yearly crops of grain.

NATURE AND CORRECT USE OF THE EXCREMENTS OF ANIMALS CONSIDERED AS MANURE; THE MODE OF ITS ACTION AND PRESERVATION. BONE DUST, AND DEAD ANIMAL MATTER.

One practical farmer applies, indiscriminately, any fertilizing material to his land in any state; another allows violent fermentation to reduce his mixture of straw and manure to one-half its weight—during which operation much gaseous ammonia is disengaged and lost, which, if retained, or supplied to the soil, would have proved extremely serviceable. Both methods cannot be right in all cases.

Besides the dissipation of gaseous matter, when fermentation is pushed to the extreme, there is another disadvantage in the loss of heat, which, if excited in the soil instead of the dunghill, is useful in promoting the springing of the seed, and in assisting the plant in the first stage of its growth, when it is most feeble and most liable to disease; and the decomposition of manure in the soil must be particularly favorable to the wheat crop, in preserving a genial temperature beneath the surface late in autumn and during winter. These views are in accordance with a well-known principle in chemistry,—that in all cases of decomposition, substances combine much more readily at the moment of their disengagement than after they have been some time perfectly formed and set at liberty. And in fermentation beneath the soil, the fluid matter produced is applied instantly, even while it is warm, to the young organs of the rising plant; and, consequently, is more likely to be efficient, than in manure that has gone through the pro-

cess, and of which all the principles have entered into new combinations.

It is certainly a matter of indifference whether we employ excrements, ashes, or bones, in carrying out the principle of restoring to the soil those substances which have been taken from it by the previous crop. But, unless we know accurately what are those matters that have been actually removed, how is it possible to supply, otherwise than at random guess, the deficiency? Fermented manure may be really useful, if no nitrogen be demanded. A time will come when fields will be manured with saline solutions, with the ashes of burnt straw, or with salts of phosphoric acid prepared in chemical manufactories. The same mixed mass of materials may be useful in one state, less so in another and under other circumstances. A knowledge of the actual wants of the land, and of the exact composition of the proposed manure, is obviously necessary to enable the farmer to adapt the one to the other as a requisite and fitting remedy. If our object be the development of the seeds of plants, we know they contain nitrogen. Our manure then must be rich in this material. If, by fermentation, ammonia be formed in the manure—if it become dry, rotten, and nearly devoid of smell, having lost its previous heat—although it may cut better with the spade, we may be sure it has lost its nitrogen, and, consequently, as far as our object is concerned, (the nutriment of the seed,) nearly lost its utility. The leaves, which by their action on the air, nourish the stem and woody fibre—the roots, from which the leaves are formed—in short, every part of the structure of a plant—contains nitrogen in small and varying proportions. But the seeds are always rich in nitrogen.

The most important object, then, of farming operations, at least as far as grain is concerned, is the supply of nitrogen to grain plants in a state capable of being taken up by them—the production, therefore, of manures containing the most of this element. Gypsum and nitrate of soda are as properly termed manures, as farmyard dung, bone-dust, or night-soil; but our present

inquiry is, what class of substances contain and yield to grain-plants most nitrogen? Nature, by the ordinary action of the atmosphere, furnishes as much nitrogen to a plant as is necessary to its bare existence. But plants do not exist for themselves alone: the greater number of animals depend upon the vegetable world for food; and, by a wise adjustment of nature, plants have the remarkable power of converting, to a certain degree, all the nitrogen offered to them into nutriment for animals. We may furnish a plant with carbonic acid, and all the materials which it may require for its mere life; we may supply it with vegetable matter in a state of decay in the most abundant quantity; but it will not attain complete development unless nitrogen be afforded to it by the supply of suitable manure: an herb will indeed be formed, but its seeds or grain will be imperfect and feeble.

But when, with proper manure, we supply nitrogen in addition to what the plant would derive from natural sources, we enable it to attract from the air the carbon which is necessary for its nutrition; that is, when that in the soil is not sufficient, we afford it a means of fixing the atmospheric carbon.

There are two principal descriptions of manure, the beneficial agency of which is deriveable almost exclusively from the large quantity of nitrogen they yield.

These are the solid as well as fluid excrements of man and animals.

Urine is employed as manure, either singly, in its liquid state, or with the fæces which are impregnated with it. It is the urine contained in night-soil which gives it the property of giving off ammonia, a property which the discharges from the bowels possess only in a very slight degree. Liquid manures act chiefly through the saline substances they hold in solution; while the solid manures, even of animal origin, contain insoluble matters which decay slowly in the soil, and there become useful only after a time. When we examine what substances we add to a soil by supplying it with urine, we find that this liquid contains in solution ammoniacal

salts, uric acid, (a substance itself containing much nitrogen,) and salts of phosphoric acid.

Human urine consists, in 1000 parts, of

Water	932
Urea, and other organic matters containing nitrogen	49
Phosphates of ammonia, soda, lime, and magnesia	6
Sulphates of soda and ammonia . .	7
Sal ammoniac and common salt .	6
	1000

In manure reservoirs, well constructed and protected from evaporation, the carbonate of ammonia, which forms in consequence of putrefaction, is retained in solution; and when the putrified urine is spread over the land, a part of this ammonia will escape with the water which evaporates. On account of the formation of carbonate of ammonia in putrid urine, it becomes alkaline, though naturally acid in its recent state; and when this carbonate of ammonia is lost by being volatilized in the air, (which happens in most cases,) the loss suffered is nearly equal to one-half of the urine employed. So that, if we fix the ammonia, (by combining it with some acid which forms with it a compound not volatile,) we increase its action two-fold. Now the carbonate of ammonia formed by the putrefaction of urine, can be fixed, or deprived of its volatility, in many ways.

If, for instance, a field be strewed with gypsum, or plaster of Paris, (in chemical language, sulphate of lime,) and then sprinkled with urine, or the drainings of the cow-shed, a double exchange or decomposition takes place. Sulphate of lime and carbonate of ammonia become converted into carbonate of lime, (that is, chalk,) and sulphate of ammonia; and this because sulphuric acid has a greater affinity for ammonia than it has for lime. This sulphate of ammonia will remain in the soil—it will not evaporate.

If a basin containing spirit of salt, or muriatic acid,

be left a few weeks in a close stable or privy, so that its surface is in free communication with the ammoniacal vapors that rise from below, crystals of muriate of ammonia, or common sal-ammoniac, will soon be visible, as an incrustation about its edges. The ammonia that escapes in this way is not only entirely lost as far as vegetation is concerned; it works also a slow but not less certain destruction of the mortar and plaster of the building; for, when in contact with the lime of the mortar, ammonia is converted into nitric acid, which gradually dissolves the lime. There are few school-boys who have not picked out crystals of nitrate of potass, or saltpetre, from an old brick wall; and in this instance the atmosphere has yielded the ammonia.

The offensive carbonate of ammonia in close stables is very injurious to the eyes and lungs of horses, as the army and veterinary surgeons are well able to testify. They adopt measures to carry it off by ventilation and cleanliness. If the floors or stables of cow-sheds were strewed with common gypsum, they would lose all their offensive and injurious smell, and none of the ammonia which forms could be lost, but would be retained in a condition serviceable as manure. This composition—swept from the stable door—nearly constitutes what is sold under the denomination of *urate*. Manufacturers of this material, state, that three or four hundred weight of urate form sufficient manure for an acre. A far more promising adventure for a practical farmer will be to go to some expense in saving his own liquid manure, and, after mixing it with burnt gypsum, to lay it abundantly upon his grain-lands: for, in this way, he may use as much gypsum as will absorb the whole of the urine. Now, in the manufacture of urate, the proportion of 10 pounds is employed to every 7 gallons—allowing the mixture (occasionally stirred) to stand some time, *pouring off the liquid*, and with it nearly all its saline contents, except the ammonia. Urate, therefore, can never present all the virtues of the urine—100 pounds of urate containing no greater weight of saline and organic matter than 10 gallons of urine.

From the foregoing analysis it would appear, that 1000 pounds of human urine contain no less than 68 pounds of *dry* fertilizing matter of the richest quality, worth, at the present rate of selling artificial manures in this country, (England,) twenty shillings per hundred weight. Suppose we say that the liquid and solid excrements of one human being amount on an average to a pound and a half daily, then in one year they will amount to 547 pounds; which, at the rate of three per cent. of contained nitrogen, would yield sixteen pounds of that material for the land—a quantity sufficient to supply enough for eight hundred pounds of wheat, rye, or oats, or for nine hundred pounds of barley. As each person in reality voids at least one thousand pounds or pints of urine in a year, the national waste incurred in this form amounts, at the above valuation, to twelve shillings a head upon every individual of the whole population. And if five tons of farm-yard manure per acre, yearly, will keep a farm in good order, four hundred weight of the solid matter of urine would probably have an equal effect; in other words, the excrements of a single individual are more than sufficient to yield the requisite nitrogen to an acre of land, in order to enable it (with the assistance of the nitrogen absorbed naturally from the atmosphere) to produce the richest possible yearly crop. Every town and farm might thus supply itself with the manure, which, besides containing the most nitrogen, contains also the most phosphates; and if an alternation of the crops were adopted, they would be most abundant. By using at the same time bones and wood-ashes, the excrements of animals might be completely dispensed with. So that the artificial, mineral, or chemical manures are no imperfect substitutes, if applied judiciously.

The urine alone discharged into rivers or sewers by a town population of 10,000 inhabitants, would supply manure to a farm of 1500 acres, yielding a return of 4500 quarters of grain, or an equivalent produce of other crops. So much value is attached to human excrements by the Chinese, that the laws of the country forbid that any of

them should be thrown away; and reservoirs are placed in every house, where they are collected with the utmost care. No other kind of manure is used for their grain-fields.

Human urine contains a greater variety of constituents than any other species examined. Urea, uric acid, and another acid similar to it in nature, called rosacic acid, acetic acid, albumen, gelatine, a resinous matter, and its various salts, are all valuable to the land, inasmuch as from the land they or their elements have been originally derived. The urine of animals that feed exclusively on flesh, contains more animal matter, and consequently more nitrogen, than that of vegetable feeders—whence it is more apt to run into the putrefactive process, and disengage ammonia. In proportion as there are more gelatine and albumen in urine, so in proportion does it putrefy more rapidly. Thus, then, all urine contains the essential elements of vegetables in a state of solution; and that will be the best for manure which contains most albumen, gelatine, and urea. Putrid urine abounds in ammoniacal salts, and is only less active as a manure than fresh urine, because of the portion of ammonia which is continually exhaling into the atmosphere.

As to the urine of cattle, it contains less water than that of man, varying with the kind of food on which the animal is fed. A cow will secrete and discharge from two thousand to three thousand gallons of urine a year; and this quantity will contain at least from 1200 to 1500 pounds of dry solid saline matters, worth from fifty to sixty dollars.

The urine of the cow is particularly rich in salts of potash, but contains very little soda. The urine of swine contains a large quantity of the phosphates of ammonia and magnesia. That of the horse contains less nitrogen and phosphates than that of man.

The fertilizing powers of animal manures, whether fluid or solid, is dependent, like that of the soil itself, upon the happy admixture of a great number, if not of all, those substances which are required by plants in the

universal cultivation they receive from the industry and skill of man, more especially upon the large proportion of nitrogen they contain. The amount of this latter material affords the readiest test by which their agricul tural value, compared with other matters and with that of each other, can be tolerably well estimated.

Ordinary farm-yard manure, in its recent state, contains a given proportion of nitrogen; but fifteen pounds of blood would yield as much nitrogen as one hundred pounds of farm-yard compost. If dried blood were taken, four pounds would be sufficient; three pounds of feathers, three of horn shavings, five of pigeons' dung, or even two and a half of woollen rags, would counterpoise one hundred of the first-named material. Sixteen would be the equivalent number for the urine of the horse, ninety-one that of the cow, seventy-three for horse-dung, one hundred and twenty-five for cow-dung; while the mixed excrements of either animal would correspond with the fact, that the discharges of the cow offer no resemblance to those of the horse.

Besides their general relative value, namely, as to the proportions of nitrogen they contain, the above matters have a further special value, dependent upon the diversity of saline and other organic matters which they severally contain. Thus, three of dried flesh are equal to five of pigeons' dung, as far as nitrogen is concerned; but then pigeons' dung contains a quantity of bone, earth, and saline matter, scarcely present in the former. Hence, the dung of fowls will benefit vegetation in some instances where even horse-flesh—ordinarily regarded as a strong manure—would fail. And why? Evidently because, if saline matters are deficient in the soil, an excessive supply of nitrogen will not serve as their substitute. So the liquid excretions contain much important saline matter not present in solid dung, nor in such substances as horn, hair, or wool; and therefore each must be capable of exercising its own peculiar influence, and be comparatively useless, if deficient of those matters which are also found wanting—deficient, yet necessary in the soil. This affords the reason why no *one*

manure can long answer on the same land; it can only supply the materials it contains. When all the silicate of potash in grain-fields is exhausted, urine will not, cannot, supply the deficiency, because it contains no silicate of potash. So long as the land remained rich in this material, urine or blood would supply the requisite nitrogen. Hence, in all ages and countries, the habit of employing mixed manures and artificial composts has been universally diffused. What is wanting is a more accurate knowledge of the precise deficiency at any given moment, and a consequent saving of capital from unnecessary waste, together with an immense increase in fertility, as the reward of so accurate an adaptation of means and ends. The knowledge of a disease is essential to the correct application of a remedy.

It is by no means difficult to prevent the destructive fermentation and heating of farm-yard compost. The surface should be defended from the oxygen of the atmosphere. A compact marl, or a tenacious clay, offers the best protection against the air; and before the dung is covered over, or, as it were, sealed up, it should be dried as much as possible. If the dung be found at any time to heat strongly, it should be turned over, and cooled by exposure to air. Watering dung-hills is sometimes recommended for checking the process of putrefaction, and the consequent escape of ammonia; but this practice is not consistent with correct chemistry. It may cool the dung for a short time; but moisture is a principal agent in all processes of decomposition. Water, or moisture, is as necessary to the change as air; and to supply it to reeking dung, is to supply an agent which will hasten its decay.

If a thermometer, plunged into the dung, does not rise much above blood-heat, there is little danger of the escape of ammonia. When a piece of paper, moistened with spirit of salt, or muriatic acid, held over the steams arising from a dung-hill, gives dense fumes, it is a certain test that decomposition is going too far; for this indicates that ammonia is not only formed, but is es-

caping to unite with the acid in the shape of sal-ammoniac.

When dung is to be preserved for any time, the situation in which it is kept is of importance. It should, if possible, be defended from the sun. To preserve it under sheds would be of great use, or to make the site of a dung-hill on the north side of a wall. The floor on which the dung is heaped, should, if possible, be paved with flat stones; and there should be a little inclination from each side towards the centre, in which there should be drains, connected with a small well, furnished with a pump, by which any fluid matter may be collected for the use of the land. It too often happens, that a heavy, thick, extractive fluid is suffered to drain away from the dung-hill, so as to be entirely lost to the farm.

Night-soil, it is well known, is a very powerful manure, and very liable to decompose. Human excrements differ in their composition, but always abound in nitrogen, hydrogen, carbon, and oxygen. From the analysis of Berzelius, it appears that a part of it is always soluble in water; and in whatever state it is used, whether recent or decomposed, it supplies abundant food to plants. But this affords no excuse for its misapplication in any other condition than that which is most profitable. It varies, no doubt, in richness with the food of the inhabitants of each district—chiefly with the quantity of *animal* food they consume; but when dry, no other *solid* manure, weight for weight, can probably be compared with it in general efficacy. The soluble and saline matters it contains are made up from the constituents of the food we eat; of course, it contains most of those elementary substances which are necessary to the growth of the plants on which we live. The disagreeable smell of night-soil may be destroyed by quick-lime. If exposed to the air in thin layers strewed over with lime, in fine weather, it speedily dries, is easily pulverized, and, in this state, may be used in the same manner as rape-cake, and delivered into the furrow with the seed. If night-soil be treated in a proper manner, so as to remove

the moisture it contains, without permitting the escape of its ammonia, it may be put into such a form as will allow it to be transported even to great distances. This is already attempted in many places; and the preparation of human excrements for exportation constitutes not an unimportant branch of industry. But the manner in which this is done, is not always the most judicious.

It is quite certain that the vegetable constituents of the excrements with which we manure our fields, cannot be entirely without influence upon the growth of the crops on them; for they will decay, and thus furnish carbonic acid to the young plants. But it cannot be imagined that their influence is very great, when it is considered that a good soil is manured only once every six or seven years; that the quantity of carbon thus given to the land corresponds only to 5 per cent. of what is removed in the form of herbs, straw, or grain; and further, that the rain-water received by a soil contains much more carbon in the form of carbonic acid than these vegetable constituents of animal excrement.

The peculiar action, then, of solid, as opposed to fluid, animal excrements, is limited to their inorganic constituents, rather than to the presence of the partially changed vegetable or organized matter which they contain. Horse-dung contains a large portion of such partially altered vegetable matter; and the reason why night-soil is a more powerful manure, is that, relatively, it contains less vegetable matter, while nitrogen is more abundant; and this, principally, because its weight is materially made up by the liquid excrement, or urine, always forming part of its composition. The restoration of inorganic matter to the land, is the chief value arising from the application of the dung of cattle. A certain amount of inorganic matter is removed with every crop. If we manure that land with the dung of the cow or sheep, we restore to the surface silicate of potash, and some salts of phosphoric acid. If we use horse-dung, we supply, chiefly, phosphate of magnesia and silicate of potash. In the straw which has served as litter, we

add a further quantity of silicate of potash, and phosphates, which, if the straw be already putrified, are exactly in the same state as before they formed part of the crop which yielded them.

But, if we use human excrements, in addition to the phosphates of lime and magnesia, we supply a larger proportion of compounds of nitrogen, essential to the development of those parts of plants upon which human beings are accustomed to feed: and, by a wise ordination, grain-plants are found associated with human dwellings—in other words, the family of man having selected such spots on the earth's surface, as are fitted for the growth of grain, animal manure is always at hand in quantity for its artificial cultivation; thus restoring, through the feculent discharges of man and animals resident on the spot, precisely those materials which the process of growth has removed from the soil.

Cow-dung is not incorrectly said to be "cold;" so much of the saline, nutritive, and other organic matters from the cow, pass off almost exclusively with her urine, that her dung does not readily heat and run into putrefaction. Still, mixed with other manures, or well diffused through the soil, its vegetable matter is not useless. It loses more than any other similar substance in drying. The dung of pigs is soft and cold, like that of the cow—containing, like it, nearly 80 per cent. of water. Mixed with other manures, it may be applied to any crop—but is of very variable quality, owing to the variety of food of the animal.

The horse is fed, generally, on less liquid food, less succulent and watery, than that of oxen. He discharges less urine; hence his dung is richer in animalized matter; or, adopting the figurative language of the farmer, it is hotter, and, indeed, runs more readily into the putrefactive fermentation.

If the solid excrements of animals are chiefly valuable for the saline, earthy, and inorganic constituents they restore to the soil which has yielded them, it will be readily inferred, that instead of dung or night-soil, other substances, containing their peculiar ingredients, may

be substituted. One hundred tons of fresh horse-dung, if dried, would leave only from 25 to 30 tons of solid matter, the rest being only water; and if this dried matter (itself only one-fourth of the original weight) were burnt, so as to decompose its vegetable ingredients, we should obtain, perhaps, 10 per cent. of really useful saline and earthy matters, (one-fortieth of the original weight,) according to the richness or poverty of the food the horse had taken.

Now, this minute proportion of saline and earthy matters, and its relative quantity, in the various kinds of excrement, forms, evidently, the chief topic of interest to which our attention should be directed; inasmuch as what is left upon such examination and analysis, is exactly what has made up the component inorganic parts of the hay, straw, grass, or oats, on which the animal has been fed; or, in other words, exactly what has been removed from the soil, and requires to be replaced, if the next crop is to equal the last. If our object is increased fertility, more must be added than has been taken away. Hay, straw, and oats, formed (for illustration's sake) the food of a horse. Their principal constituents are the phosphates of lime and magnesia, carbonate of lime, and silicate of potash; the first three of these preponderated in the corn, the latter in the hay—and these, removed from the soil with the crop, are precisely the saline matters which would be found in the excrement of the animal for whose support that crop was intended.

In order, then, to atone for the absence of that excrement which derives its value from the soil which has produced it, and for which it is peculiarly fitted, as containing what that soil has lost, the ashes of wood or bones may often be judiciously substituted—and for this reason: wood-ashes contain silicate of potash, exactly in the same proportion as that salt is found to exist in the straw of the last crop; and as to bones, the greatest part of their bulk consists of the phosphates of lime and magnesia. Ashes obtained from various trees are of unequal value: those from oak-wood are the least—those

from beech, most serviceable. With every 100 pounds of the ashes of the beech spread over a soil, we furnish as much phosphates as 460 pounds of fresh night soil could yield. But night-soil contains other useful matters besides phosphates; hence the utility of mixed composts; as, evidently, the ashes of the beech could not alone secure fertility.

Bone manure possesses still greater importance than wood ashes as a substitute for an indefinite and large supply of animal excrement. The primary sources from which the bones of animals are derived, are—the hay, straw, or other substances which they take as food. Now, bones contain more than half their weight of the phosphates of lime and magnesia; and hay contains as much of these salts as wheat straw. It follows, then, that 8 pounds of bones contain as much phosphate of lime as 1000 pounds of hay or wheat straw; and 2 pounds of bones as much as is found in 1000 of the grain of wheat or oats. These numbers express pretty exactly the quantity of phosphates which a soil yields annually on the growth of hay and corn. Upon every acre of land appropriated,to the growth of wheat, clover, potatoes, or turnips, forty pounds of bone-dust will be found sufficient to furnish an adequate supply of phosphates for three successive crops.

To secure the best application of bones, they should be reduced to powder; and the more intimately they are mixed with the soil, the more easily are they taken up and assimilated. The most easy and practical mode of effecting this, is to pour over the bones, in powder, half their weight of sulphuric acid, (or oil of vitriol,) diluted with three or four parts of water; and after they have remained in contact some time—say a fortnight—to add one hundred parts of water, and sprinkle this mixture over the field before the plough. Bones may be preserved unchanged, for thousands of years, in dry, or even in moist soils, provided the access of rain be prevented, as is exemplified by the bones of animals buried previous to the flood, found in loam or gypsum—the interior parts being protected by the exterior from the

action of water. But they become warm when reduced to a fine powder: and moistened bones generate heat, and enter into putrefaction; the gelatine which they contain is decomposed, and its nitrogen converted into carbonate of ammonia, and other ammoniacal salts, which are retained, in a great measure, by the powder itself. Bones burnt till quite white, and recently heated to redness, will absorb seven times their volume of ammoniacal gas. The analysis of bone enables us to say, that while 100 pounds of bone-dust add to the soil 33 of gelatine, the organized substance of horn, or as much organized matter as is contained in 300 or 400 pounds of blood or flesh, they add, at the same time, more than half their weight of inorganic matter, lime, magnesia, soda, common salt, and phosphoric acid, in combination with some of these—all of which, as we have seen, must be present in a fertile soil, since the plants require a certain supply of them all at every period of their growth, but more especially during the maturation of the straw and grain. These substances—like the inorganic matter of plants ploughed into the soil—may, and do exert a beneficial agency upon vegetation after all the organized structure of such decaying plants is broken up and destroyed. One hundred parts of dry bones contain 33 per cent. of dry gelatine, and are equivalent to 250 parts of recent human urine. We do not speak now of the bone-dust which remains after all the animal gelatine is removed, in boiling them to extract size for the calico-printer.

Horn is a still more powerful manure than bone: that is to say, it contains a greater proportion of organized animal matter. The peculiarity is, that horn, hair, and wool, as organized substances, are dry; while blood and flesh contain from 80 to 90 per cent. their weight of water. Hence, a ton of horn-shavings, of hair, or of dry woollen rags, ought to enrich the soil with as much animal matter (and consequently nitrogen,) as would be yielded by ten tons of blood. In consequence of this dryness, horn and wool decompose more slowly than blood; and hence, the effect of soft animal matters is

more immediate and apparent than that of hard and dry animal matters—the action of which is, nevertheless, stronger, and continues for a longer period.

The refuse of the different manufactories of skin and leather form very useful animal manures; such as the shavings of the currier, furrier's clippings, and the offals of the tan-yard and of the glue-maker. The gelatine contained in every kind of skin, is in a state fitted for its gradual decomposition; and when buried in the soil, it lasts for a considerable time, and constantly affords a supply of nutritive matter to the plants in its neighborhood. These manures contain nitrogen as well as phosphates, and consequently are well fitted to aid the process of vegetable growth.

From what has been stated, we may arrive at the following conclusions:—

1. That fresh human urine yields nitrogen in greater abundance to vegetation than any other material of easy acquisition; and that the urine of animals is valuable for the same purpose, but not equally so.

2. That the mixed excrements of man and animals yield (if carefully preserved from further decomposition) not only nitrogen, but other invaluable saline and earthy matters that have been already extracted in food from the soil.

3. That animal substances which, like urine, flesh, and blood, decompose rapidly, are fitted to operate immediately and powerfully on vegetation.

4. That *dry* animal substances, as horn, hair, or woollen rags, decompose slowly, and (weight for weight) contain a greater quantity of organized as well as unorganized materials, manifesting their influence it may be for several seasons.

5. That bones, acting like horn, in so far as their animal matter is concerned, may, according as they have been more or less finely crushed, ameliorate the soil by their earthy matter for a long period, (even if the jelly they contain have been injuriously removed by the size-maker,) permanently improving the condition and adding to the natural capabilities of the land.

OF THE INVESTIGATIONS OF
PROFESSOR LIEBIG, SIR HUMPHRY DAVY,

THE AMERICAN GARDENER.

BY WM. COBBITT, M. P.

SITUATION OF A GARDEN.

The ground should be as nearly on a level as possible; because, if the slope be considerable, the heavy rains do great injury, by washing away the soil. However, it is not always in our power to choose a level spot; but, if there be a slope in the ground, it ought, if possible, to be towards the South. For, though such a direction adds to the heat in summer, this is more than counterbalanced by the earliness which it causes in the spring. By all means avoid an inclination towards the North, or West, and towards any of the points between North and West. After all, it may not be in our power to have a level spot, nor even a spot nearly level; and then we must do our best with what we have.

I am speaking here solely of a kitchen-garden. All large trees ought to be kept at a distance of thirty or forty yards. For, the shade of them is injurious, and their roots a great deal more injurious, to every plant growing within the influence of those roots. It is a common but very erroneous notion, that the trees, which

grow in the hedges that divide the fields, do injury by their shade only.

If it be practicable, without sacrificing too much in other respects, to make a garden near to running water, and especially to water that may be turned into the garden, the advantage ought to be profited by. Watering with a watering pot is seldom of much use, and it cannot be practised upon a large scale. It is better to trust to judicious tillage and to the dews and rains. The moisture which these do not supply cannot be furnished, to any extent, by the watering-pot. A man will raise more moisture with a hoe or spade, in a day, than he can pour on the earth out of a watering-pot in a month.

SOIL

The plants which grow in a garden, prefer, like most other plants, the best soil that is to be found. The best is, loam of several feet deep, with a bed of lime-stone, sand-stone, or sand below.

Having fixed upon the spot for the garden, the next thing is to prepare the ground. This may be done by ploughing and harrowing, until the ground, at top, be perfectly clean; and, then, by double ploughings: that is to say, by going with a strong plough that turns a large furrow and turns it cleanly, twice in the same place, and thus moving the ground to the depth of fourteen or sixteen inches, for the advantage of deeply moving the ground is very great indeed. When this has been done in one direction, it ought to be done across, and then the ground will have been well and truly moved.

The ground being ploughed in October, ought to be well manured at top with good well-rotted manure, or with soap-boiler's ashes, or some other good manure; and this might be ploughed, or dug in shallowly. Before the frost is gone in the spring, another good coat of manure should be put on; well-rotted manure from the yard, ashes, or rather, if ready, from a good compost.

Then, when the frost is gone, the ground will be instantly fit for digging and planting; and, it will bear almost anything that can be put into it.

MANURES ADAPTED TO A GARDEN.

It is generally thought, and, I believe truly, that manure of any sort, is not what ought to be used in the raising of garden vegetables. It is very certain, that they are coarse and gross when produced with aid of that sort of manure, compared to what they are when raised with the aid of ashes, lime, rags, and composts. And besides. dung in hot soils and hot climates, adds to the heat; while ashes, lime, rags, and composts do not; but, on the contrary, they attract, and cause the earth to retain moisture.

All the ground in a garden ought always to be good, and it will be kept in this state if it be well manured once every year. Perhaps it will scarcely ever be convenient to any one to manure the whole garden at one time: and this is not of so much importance. Clay, or any earth, burnt, is excellent manure for a garden. It has no seeds of weeds or grass in it. A compost made of such ashes, some wood-ashes, a small portion of horse-dung, rotten leaves, and mould shovelled up under trees, round buildings, or on the sides of roads,—all these together, put into a heap, and turned over several times, make the best of manure for a garden.

A great deal more is done by the fermentation of manures than people generally imagine. In the month of June take twenty cart loads of earth, which has been shovelled off the surface of a grassy lane, or by a road side, or round about barns, stables, and the like. Lay these twenty loads about a foot thick on some convenient spot. Go and cut up twenty good cart-loads of weeds of any sort, and lay these well shaken up, on the earth. Then cover the weeds with twenty more cart-loads of earth like the former, throwing the earth on lightly. In three days you will see the heap smoke as if on fire. If you put your hand into the earth, you

will find it too hot to be endured. In a few days the heat will decline, and you will perceive the heap sink. Let it remain a week after this, and then turn it very carefully. This will mix the whole well together. You will find the weeds and grass in a putrid state. Another heating will take place, but less furious than the former. Turn it a second time in seven days: and a third time in seven days more. And by this time you will have forty cart loads of manure, equal in strength to twenty of yard dung, and a vast deal better for a garden, or indeed, for any other land. It is not expensive to obtain this sort of manure; and such a heap, or part of such a heap, might at all times be ready for the use of the garden. When such a heap is once formed, some ashes, fish shells or bones, reduced to powder, or other enlivening matter, may be added to it and mixed well with it; and thus will a store be always at hand for any part of the garden that might want it.

LAYING-OUT.

The laying-out of a garden consists in the division of it into several parts, and in the allotting of those several parts to the several purposes for which a garden is made. These parts consist of walks, paths, plats, borders, and a hot-bed ground.

HOT-BEDS

Dung of horses, cattle, sheep or pigs, is used to make the bed of. Either may be made to do, with a greater or less degree of care and trouble; but, the best possible thing is dung from the stable, taken away before it has been rotted, short and long promiscuously, but rather long than short. If there be a large proportion of short, it may have any litter added to it; any broken straw or hay, or corn stalks, in order to make a due mixture of long and short. Shake every fork full well to pieces, and

mix well the long with the short; and thus go on till you have the whole in a round heap rising to a point.

The second day after this heap is made it will begin to send forth steam. Let it remain three days in this state; that is to say, four clear days after the day of making the heap. Then turn the heap back again, shaking all well to pieces, as before, and bringing to the inside that part of the stuff which was before on the outside of the heap. Let it remain now three clear days after the day of turning. Then turn it again, shaking well to pieces as before, and bringing again the outside stuff to the inside. When it has remained two clear days in this state, it is fit to make the bed with.

The Frame is of the best shape when it is eighteen inches deep at the back, and nine inches deep at the front. This gives slope enough. The Frame is the wood work, on which the lights, or glass-work are laid. There needs no more than a good look at a thing of this sort to know how to make it, or to order it to be made. I suppose a three-light frame, four feet wide and nine feet long, which of course will make every light three feet wide and four long; because, the long way of the light fits, of course, the cross way of the frame.

The front of the bed is to be full South, so that the noon sun may come right upon the glass. The length and width of the bed must be those of the frame.

When you have shaken on dung to the thickness of four or five inches, beat all over well. But you must be very careful to keep the edges of the bed well beaten, or else they will be more hollow, and will sink more than the rest, and then the earth on the bed will crack in the middle. Comb the sides frequently down with the tines of the fork. At last, shovel and sweep up all the short earthy stuff around the bed and where your dung-heap was, and lay it very smoothly on the top of the bed; and make all as smooth and as level as a die with the back of your shovel.

Then put on the frame and fix it nicely. Then put the lights upon the frame. If you finish your bed by

noon, the heat will begin to rise by next morning, and by noon of the second day after the bed is made, the heat will be up. Poke your finger as deep as you can into the middle of the bed when you have taken off one of the lights. If the heat be so great as to burn your finger; that is to say, if you cannot endure the heat, then it is too great to receive the earth; but if not, put on the earth all over the bed. If the heat be too great, give the bed a little air, and wait till a little of the heat be gone off.

The earth should be dry; not like dust; but not wet. I made provision for my bed by putting earth in my cellar in November. It is not much that is wanted. The bed is to be covered all over, about six inches deep. When the earth has been on twenty-four hours, take off the lights and stir the earth well with your hands; for hands are the only tools used in a hot-bed. When you have stirred the earth well, and made it level and smooth, you may sow your seed, if you do not find the earth too hot. But, observe, the earth is to be level, and not sloping like the glass. The glass is sloping to meet the sun, and to turn off the wet; but the earth must lie perfectly level; and this, you will observe, is a very great point.

SOWING.

The more handsomely this is done the better. When you have taken off all the lights, make little drills with your finger, from the back of the bed to the front, half an inch deep and about an inch apart. Make them equi-distant, parallel, and straight. Then drop in your cabbage seeds along the drills, very thin; put twenty seeds perhaps in an inch; for some will not grow, and some may be pulled up when they appear. It is better to have rather too many than too few. When you have dropped in your seeds all over the bed, and distinguished the several sorts of cabbages by names or numbers written on a bit of paper, and put into the cleft of a little stick and stuck in the ground; then cover all the

seeds over neatly and smoothly. Put on the lights, and look upon your spring work as happily begun.

MANAGEMENT OF A HOT-BED.

Always give as much air as the plants will endure. I suppose the hot-bed, made as above, to be about four feet high, when just finished. It will sink as it heats; and will, at last, come to about a foot and a half. Its heat will gradually diminish; but it will give a great heat for about six weeks, and some heat for four months. It is this bottom heat that makes things grow. The sun is often hot in May; but it is not until the earth is warm that vegetation advances with rapidity.

Even before the seeds begin to appear give air to the bed every day, unless it be very cold weather indeed. The usual way of giving air is by bits of thick board, cut in the shape of a triangle, or rather, like a wedge, broad at one end, and coming to a point at the other. Each light is lifted up, either at back or front of the frame, as the wind may be, and the wedge, or tilter, as it is called, is put in to hold the light up. But, if more air be wanted, the lights may be shoved up or down, and, on a fine day, actually taken off.

When the plants come up, they will soon tell you all about air; for, if they have not enough, they will grow up long-legged, and will have small seed leaves, and indeed, if too much deprived of air, will drop down and die. Let them grow strong rather than tall. Short stems, broad seed leaves, very green; these are the signs of good plants and proper management.

It will be necessary to water. Take off a light at a time, and water with a watering pot that does not pour out heavily. Water just about sunset: and then shut down the lights; and the heat will then rise, and make the plants grow prodigiously.

As soon as the plants are fairly up, thin them, leaving four in an inch; stir the ground about at the same time with your finger. This will leave in the frame from twenty-five to thirty thousand plants. If you want less,

sow in wide rows and thinner in the row. Do not attempt to make the plants grow fast. You are sure to destroy them if you make this attempt.

GREEN-HOUSES.

A green-house is for the purpose of having plants and flowers flourishing, or, at least, in verdure and in bloom in winter. The best place for a green-house is near the dwelling-house, and it should be actually joined to the dwelling-house, one of the rooms of which should have windows looking into the green-house, which latter, however, must face the South.

In most cases the warmth might go from the parlor fire-place; for, all that is wanted, is completely to keep out frost. There is, here, no want of sun even in the coldest weather; and, if the green-house were on the Eastern side of the dwelling-house, the cold would not be any great annoyance. But, at any rate, the heat necessary to keep out frost might easily be obtained.

A thermometer should be kept in the green-house. The heat should be about sixty degrees in the day time, and forty-five in the night.

Air is the main thing after the keeping out of the frost. Air is given by pushing up or drawing down the lights, which form the top or roof of the green-house. Always give air when there is no fear of frost. Give heat and air at the same time, if the weather be not mild enough to dispense with the heat. For, without air, the plants will become sickly. They have lungs as well as we; and, though they may live for a while without air, they will be an eye-sore instead of a delight to the beholder. If the sides and front, as well as the top of the green-house be of glass (which is best), then air may be given there, instead of giving it by pushing up or pulling down the lights at top.

The plants, of whatever sort or size, must be in pots or jars. The pots ought never to be glazed. Plain earthen pots are best as well as cheapest. There must be a hole in the middle of the bottom of every pot, or

no plant will live in it for any considerable length of time, and will never grow in it at all. This hole should be in proportion to the size of the pot; and the pots may be from 4 inches to 18 inches over at top, and from 4 inches to 18 inches deep; being one-third less across at bottom than at the top. The smallest hole ought to be of the size of half a dollar.

Some care is necessary in sowing and planting in pots. The mould should be good, and made very fine. The first thing is to put an oyster shell, or piece of broken earthen ware into the pot, to cover the hole at the bottom; and the hollow part of the shell or other thing, should be downwards. The use of this is, to keep the hole open, that the water may find its way out of the pot, and not lie stagnant at the bottom, where it would become sour and injure, if not kill the plant. The earth, if there were no shell, would fill up the hole, and would, in time, become solid, and thus prevent the water from getting out.

The benches of the green-house should rise one above another, like the steps of stairs, that the whole of the plants may share in the benefit bestowed by the sun; but there may be some on the ground, or floor; and indeed, the precise arrangement must be left to the taste of the owner.

ON PROPAGATION

AND

CULTIVATION IN GENERAL.

The propagation of plants is the bringing of them forth, or the increasing and multiplying of them. This is effected in several different ways: by seed, by suckers, by offsets, by layers, by cuttings. But bear in mind, that all plants, from the radish to the oak, may be propagated by the means of seed; while there are many plants which can be propagated by no other means; and of these the radish and the oak are two.

SORT OF SEED.

We should make sure here; for, what a loss to have late cabbages instead of early ones! As to beans, peas, and many other things, there cannot easily be mistake or deception. But, as to cabbages, cauliflowers, turnips, radishes, lettuces, onions, leeks, and numerous others, the eye is no guide at all. If, therefore, you do not save your seed, you ought to be very careful as to whom

you purchase of; and, though the seller be a person of perfect probity, he may be deceived himself.

I know of no seed, which, if sound and really good, will not sink in water. The unsoundness of seed arises from several causes. Unripeness, blight, mouldiness, and age, are the most frequent of these causes. The first two, if excessive, prevent the seed from ever having the germinating quality in them. Mouldiness arises from the seed being kept in a damp place, or from its having heated. When dried again it becomes light. Age will cause the germinating quality to evaporate; though, where there is a great proportion of oil in the seed, this quality will remain in it many years.

SAVING AND PRESERVING SEED.

First, as to the saving of seed, the truest plants should be selected; that is to say, such as one of the most perfect shape and quality. In the cabbage we seek small stem, well-formed leaf, few spare or loose leaves; in the turnip, large bulb, small neck, slender-stalked leaves, solid flesh, or pulp; in the radish, high color (if red or scarlet), small neck, few and short leaves, and long top, the marks of perfection are well known, and none but perfect plants should be saved for seed.

Effectual means must be taken to prevent a mixing of the sorts, or, to speak in the language of farmers, a crossing of the breeds.

There can be no cross between a cabbage and a carrot: but there can be between a cabbage and a turnip; between a cabbage and a cauliflower nothing is more common; and, as to the different sorts of cabbages, they will produce crosses, presenting twenty, and perhaps a thousand degrees from the Early York to the Savoy. Turnips will mix with radishes and ruta baga; all these with rape; the result will mix with cabbages and cauliflowers; so that, if nothing were done to preserve plants true to their kind, our gardens would soon present us with little besides mere herbage.

I always sow new seed in preference to old, if, in all other respects, I know the new to be equal to the old.

Parsnips, carrots, beets, onions, and many other things, may be safely sown in the fall. The seed will not perish, if covered by the earth. But then, care must be taken to sow early enough in the fall for the plants to come up before the frosts set in. The seed of all plants will lie safe in this way all the winter, though the frost penetrate to the distance of three feet beneath them, except the seeds of such plants as a slight frost will cut down. The seed of kidney beans, for instance, will rot, if the ground be not warm enough to bring it up. So will the seed of cucumbers, melons, and Indian corn, unless buried beyond the reach of the influence of the atmosphere. Even early peas would be best sown in the fall, could you have an insurance against mice. We all know what a bustle there is to get in early peas. If they were sown in the fall, they would start up the moment the frost were out of the ground, and would be ten days earlier in bearing, in spite of every effort made by the spring-sowers to make their peas overtake them. In some cases it would be a good way, to cover the sown ground with litter, or with leaves of trees, as soon as the frost has fairly set in; but, not before; for, if you do it before, the seed may vegetate, and then may be killed by the frost.

When the seeds are properly, and at suitable distances placed in the drills, rake the ground, and in all cases, tread it with your feet, unless it be very moist. Then rake it slightly again; for all seeds grow best when the earth is pressed closely about them. When the plants come up, thin them, keep them clear of weeds, and attend to the directions given under the names of the several plants.

TRANSPLANTING.

The weather for transplanting, whether of table vegetables, or of trees, is the same as that for sowing. If

you do this work in wet weather, or when the ground is wet, the work cannot be well done. It is no matter what the plant is, whether it be a cucumber plant, or an oak tree. It has been observed, as to seeds, that they like the earth to touch them in every part, and to lie close about them. It is the same with roots. One half of the bad growth that we see in orchards arises from negligence in the planting; from tumbling the earth carelessly in upon the roots. The earth should be fine as possible; for, if it be not, part of the roots will remain untouched by the earth. If ground be wet, it cannot be fine. And, if mixed wet, it will remain in a sort of mortar, and will cling and bind together, and will leave more or less of cracks when it becomes dry.

If possible, therefore, transplant when the ground is not wet; but, here again, as in the case of sowing, let it be dug, or deeply moved and well broken, immediately before you transplant into it. There is a fermentation that takes place immediately after moving, and a dew arises which did not take place before. These greatly exceed, in power of causing the plant to strike, anything to be obtained by rain on the plants at the time of planting, or by planting in wet earth. Cabbages and ruta-baga (or Swedish turnip), I have proved in innumerable instances, will, if planted in freshly-moved earth, under a burning sun, be a great deal finer than those planted in wet ground, or during rain. There never was a greater, though most popular error, than that of waiting for a shower in order to set about the work of transplanting.

If you transplant in hot weather, the leaves of the plants will be scorched; but the hearts will live; and the heat assisting the fermentation, will produce new roots in twenty-four hours, and new leaves in a few days. Then it is that you see fine vegetation come on. If you plant in wet, that wet must be followed by dry; the earth, from being moved in wet, contracts the mortary nature; hardens first, and then cracks; and the plants

will stand in a stunted state till the ground be moved about them in dry weather.

However, there are some very tender plants; plants so soft and juicy as to be absolutely burnt up and totally destroyed, stems and all, in a hot sun, in a few hours. Cucumbers and melons, for instance, and some flowering plants. These, which lie in a small compass, must be shaded at least, if not watered upon their removal.

In the act of transplanting, the main things are to take care not to bury the heart of the plant; and to take care that the earth be well pressed about the point of the root of the plant. To press the earth very closely about the stem of the plant is of little use, if you leave the point of the root loose. I beg that this may be borne in mind; for the growth, and even the life of the plant depend on great care as to this particular.

CULTIVATION.

If the plants be from seed, the first thing is to see that they stand at a proper distance from each other; because, if left too close, they cannot come to good. Let them also be thinned early; for, even while in seed-leaf they injure each other. Carrots, parsnips, lettuces, every thing, ought to be thinned in the seed-leaf.

Hoe, or weed, immediately. Weeds never ought to be suffered to get to any size either in field or garden, and especially in the latter.

Besides the act of killing weeds, cultivation means moving the earth between the plants while growing. This assists them in their growth: it feeds them: it raises food for their roots to live upon. A mere flat-hoeing does nothing but keep down the weeds. The hoeing when the plants are become stout, should be deep; and, in general, with a hoe that has tines, instead of a mere flat plate. In short, a sort of prong in the posture of a hoe. And the spanes of this prong-hoe may be longer or shorter, according to the nature of the crop to be hoed. Deep hoeing is enough in some cases;

but in others, digging is necessary to produce a fine and full crop. If any body will have a piece of fine cabbages, and will dig between the rows of one-half of them, twice during their growth, and let the other half of the piece have nothing but a flat-hoeing, that person will find that the half which has been digged between, will, when the crop is ripe, weigh nearly, if not quite, twice as much as the other half.

It may appear, that to dig thus among growing plants, is to cut off or tear off their roots, of which the ground is full. This is really the case, and this does great good; for the roots, thus cut asunder, shoot again from the plant side, find new food, and send instantly fresh vigor to the plant.

VEGETABLES AND HERBS.

We now treat of the things cultivated in the garden to be eaten at our tables as food; and they are vegetables. Herbs are usually placed as a class separate from vegetables; but while some of them are merely medicinal, like pennyroyal, others are used not only in medicine and soups, but also eaten in salads. Therefore, it appeared to be best to bring into this one alphabetical list, plants usually grown in a garden, except such as come under the heads of fruits and flowers.

ARTICHOKE.

A plant little cultivated in America, but very well worthy of cultivation. In its look it very much resembles a thistle of the big-blossomed kind. It sends up a seed stalk, and it blows, exactly like the thistle. It is, indeed, a thistle upon a gigantic scale. The parts that are eaten, are the lower end of the thick leaves that envelope the seed, and the bottom out of which those leaves immediately grow. The whole of the head, before the bloom begins to appear, is boiled, the pod leaves are pulled off by the eater, one or two at a time, and dipped in butter, with a little pepper and salt, the mealy

part is stripped off by the teeth, and the rest of the leaf put aside, as we do the stem of asparagus. The bottom, when all the leaves are thus disposed of, is eaten with knife and fork.

Artichokes are propagated from seed, or from off-sets. If by the former, sow the seed in rows a foot apart, as soon as the frost is out of the ground. Thin the plants to a foot apart in the row; and in the fall of the year, put out the plants in clumps of four, in rows three feet apart, and the rows six feet asunder. They will produce their fruit the next year. When winter approaches, earth the roots well up; and before the frost sets in, cover all well over with litter from the yard or stable. Open at the breaking up of the frost; dig all the ground well between the rows; level the earth down from the plants. You will find many young ones, offsets, growing out from the sides. Pull these off, and, if you want a new plantation, put them out as you did the original plants. They will bear, though later than the old ones, that same year. As to sorts of this plant, there are two, but they contain no difference of any consequence: one has its head, or fruit pod, round; and the other, rather conical. As to the quantity for a family, one row across one of the plats will be sufficient.

ASPARAGUS.

It is propagated from seed. Gather the seed when it is dead ripe. Sow it thinly in drills a foot asunder, and two inches deep, three weeks, or about, before the frost sets in. Press the earth well down upon the seed, and as soon as the frost sets in, but not before, cover the ground with muck, or litter, a foot deep, and lay some boards or poles, to prevent its blowing off. As soon as the frost breaks up in the spring, take off the litter; and you will have the plants quickly up. When the plants are fairly up, thin them to four inches asunder; for they will be four times as strong at this distance as if they

stood close. Keep them clean, and hoe deeply between them all the summer. To have beds of asparagus, there are two ways: first, sowing the seed in the bed at once; and second, making the beds, and removing the plants into them. It is desirable to have the beds about four feet wide, that you may cut the asparagus by going in the paths between them, and not trample the beds.

In the fall, having made all the ground right strong with manure, draw the earth to six inches deep from the top of the beds into the paths, which will then form high ridges. Then draw your drills a foot apart, and sow your seed. When they are up in the spring, thin them to a foot apart. Thus you will have them a foot apart all over the bed. Keep the plants clean all summer, and when the haulm is yellow in the fall, cut them off near, or close to the ground; but let the haulm be quite dead first; yet, do it before the frost actually sets in. When you have cut off the haulm, lay some litter upon the bed till spring, to prevent the frost from being too long coming out of the ground in spring. When the frost breaks up, throw some wood ashes, or some other manure about an inch deep over the bed, having first loosened the top of the bed with a fork. Upon this manure, throw earth over the bed, out of the paths, three inches thick, and break it very fine at the time. In the fall cut down the haulm again as before; repeat the winter operation of littering; and in the spring again fork up, put on ashes or good mould, and the other three inches deep of earth out of the paths. Thus you bring the beds to be an inch or two higher than the paths; and this year, if your work have all been well done, you may have some asparagus to eat. The next fall, and every succeeding fall, cut down the haulm and cover with litter as before; and in the spring of this third year, put on ashes again, or other fine manure, and throw over the beds the earth that will come out of the paths dug six inches deep. This will make the paths six inches lower than the beds, and that is a

great convenience for weeding, and for cutting the asparagus. After this, you are to cut down the haulm in the fall, cover with litter during winter, fork up and occasionally manure in the spring, to keep the ground constantly free from weeds, to dig paths up every fall, and keep them clear from weeds in summer.

The second method of making the beds is, to begin with plants, instead of seed. The plants (raised as above stated), may be planted in the beds at one year old, or older, if it so happen. Plant them at the same depth that is pointed out for depositing the seed. And, in all other respects, proceed as in the case of a bed begun with seed. As to the time of beginning to cut, some say the third year, some the fourth, and some even the fifth. There can be no fixed time; for, so much depends on the soil and treatment. Asparagus, like other things, ought to be used when it comes in perfection, and not before. All that has here been said proceeds upon the supposition that the soil has a dry bottom. If a wet bottom, sow or plant at the top of the ground, and in all other respects proceed as in the case of a dry bottom; except, that the earth to cover the bed with must, time after time, be dug out of the paths, which will, at last, make the paths into ditches, three feet deep from the tops of the beds. By these means the roots of the plants will be kept some years longer from reaching the cold, sour soil, at the bottom; for, whenever they reach that, the plants, like all others, cease to flourish, and begin to decay.

Asparagus may be had in winter with the greatest facility. There are but few things that are worth the trouble of a hot-bed for the purpose of having them to eat in their opposite season; but asparagus is worth it. And this is the way to have it for the table, even in February, that month of snow and of north-westers.

BALM

Is an herb purely medicinal. A very little of it is suf-

ficient in a garden. It is propagated from seed, or from offsets. When once planted, the only care required is to see that it does not extend itself too far.

BASIL

Is a very sweet annual pot-herb. There are two sorts, the dwarf and the tall. It should be sown in very fine earth, and, if convenient, under a hand-glass. The bunches may be dried for winter use.

BEAN.

The bean I here mean is, what is called by most persons in America, the horse-bean. It is, at best, a coarse and not very wholsesome vegetable. There are several sorts of these garden-beans, the best of which is the flat-seeded bean, called the Windsor-bean. The long pod is the next best; and, though there are several others, these are enough to mention here.

The bean is difficult to raise. It does not like dry and hot weather; and it likes moist and stiff land. If attempted to be raised, it should be sown in the fall by all means; but, still it is useless to sow, unless you guard against mice.

Ten rows of these beans across the south border, four feet apart, and the beans four inches apart, will be enough for a family.

BEAN (KIDNEY).

Endless is the variety of sorts. Some are dwarfs, some climbers; but the mode of propagating and cultivating is nearly the same in all, except that the dwarfs require smaller distances than the climbers, and that the latter are grown with poles, which the former are not. I prefer sowing the dwarfs in rows to sowing them in bunches or clumps. If you have a glazed frame, or a hand glass or two, use one or the other in this case; but if not, dig a hole and put in it, well shaken together, a

couple of wheelbarrows full of good hot dung; and lay some good rich mould upon it six inches thick. Then lay on this some of the earliest sort of dwarf-beans. Put them not more than an inch apart, and cover them with two inches of fine rich mould. Bend some rods over the whole, and put the ends of the rods in the ground; and every evening, cover this sort of roof over with a bit of old carpet or sail-cloth. In default of these, corn-stalks may do. Do this when the winter frost is just got out of the ground, or soon after. The beans will be up in a week's time; and in about a fortnight afterwards, they will be fit to remove. The place for them is under a wall, a paling, or a hedge, facing the South. Prepare the ground well and make it rich. Take a spade and carry away a part of the beans at a time, and plant them at six inches asunder with as much earth about the roots as you can. Plant them a little deeper than they stood in the bed. They are very juicy, and may have a little water given them as soon as planted. Shade them the first day, if the weather be warm and the sun out; and cover them every night till all frosts be over. This is easily done, if against any sort of fence, by putting boards, one edge upon the ground and the other leaning against the fence; but if you have no fence, and have to plant in the open ground, it will be best to plant in clumps, and flower-pots put over the clumps will do for a covering.

As to the main crop, it is by no means advisable to sow very early. If you do, the seed lies long in the ground, which is always injurious to the plant. The plants come up feebly. The cold weather that occasionally comes, makes them look yellow; and they then never produce a fine crop.

Of the various sorts of pole-beans, one sowing is enough; for, if you gather as the beans become fit for use, they continue bearing all through the summer, especially the Lima-bean, which delights in heat, and for which no weather can be too dry; and which should never be sown till the ground be right warm. The

dwarf sorts may be sown all summer, from the time that the ground becomes warm to within seven weeks of the time that the little frosts begin in the fall; for they will at this season, produce for eating green, in six weeks from the day of sowing.

As to the sorts of kidney-beans, they are almost endless in number. I will, however, name a few: The dun, or drab-colored dwarf bean, is the earliest. The same ground will bear and ripen two crops in one year, the last from the seed of the first. The yellow; the black; the speckled; the painted white and red: these are all dwarfs; but there are a great many others. Among runners, or pole-beans, there are the scarlet-blossom, the seed of which is red and black, and the seed-pod rough. There is a white bean precisely like the former, except that the bean and blossom are white. The case-knife bean: this is the best bean of all to eat green. Then there is the cranberry-bean of various colors as to seed. The Lima-bean, which is never eaten green, (that is, the pod is never eaten,) and which is sometimes called the butter-bean, has a broad, flat, and thin seed of a yellowish-white color.

BEET.

It should be sown in the fall; but, if not, as soon as the ground is free from frost, and is dry in the spring. The rows a foot apart, and the plants eight inches apart in the rows. In order to hasten the seed up in the spring (if sown then), soak it four days and nights in rain-water before you sow it. Put it two inches deep, cover it well, and press the earth hard down upon it. Sow the seed pretty thick all along the drill; and when the plants come up, thin them to eight inches apart. Hoe between the plants frequently: but not very deep; because these tap-rooted things are apt to fork if the ground be made loose very low down while they are growing.

There are yellow and white beets, as well as red; but

the red is the true kind: the others are degenerate. There is, however, round or turnip-rooted red beet, which is equally good with the tap-rooted red beet.

The ground should be rich, but not fresh dunged. Ashes of wood, or compost mould, is best; and the digging ought to be very deep, and all the clods ought to be broken into fine earth; because the clods turn the point of the root aside, and make the tap short, or forked. Fresh dung, which, of course, lies in unequal quantities in the ground, invites the tap-root, or some of the side roots to it, and thus causes a short or forked beet, which, for several reasons, is not so good as a long and smooth one.

As to the preserving of beets during the winter, it is well known, that the way is to put them in a dry cellar, with dry sand between them, or indeed, without sand or anything at all between them. They may, if in large quantities, and not wanted till spring, be preserved out of doors, thus: Take them up three weeks before the hard frost is to come. Cut off their leaves; let them lay two or three days upon straw, or boards, to dry in the sun; then lay a little straw upon the ground, and, in a fine dry day, place ten bushels of beets (picking out all the cut or bruised ones) upon it in conical form. Put a little straw smoothly over the heap; then cover the whole with six or eight inches of earth; and place a green turf at the top to prevent the earth from being washed by rain from the point, before the frost set in. The whole heap will freeze during the winter; but the frost will not injure the beets, nor will it injure carrots, preserved in the same way. If you have more than ten bushels, make another heap, or other heaps, for fear of heating before the frost comes. When that comes, all is safe till spring; and it is in the spring, that season of scarcity, for which we ought to provide.

BURNET

Is a well known grass, or cattle plant. It is used by

some in salads. When bruised, or cut, it smells like cucumber. It is a perennial.

CABBAGE.

In the open ground you may put your seed rows at six inches distance, and put the seeds thin in the row. As soon as up, thin the plants to three inches in the row.

To have fine cabbages, of any sort, the plants must be twice transplanted. First, they should be taken from the seed bed (where they have been sown in drills near to each other,) and put out into fresh dug, well broken ground, at six inches apart every way. By standing here about fifteen or twenty days, they get straight and strong, stand erect, and have a straight and stout stem. Out of this plantation they come nearly all of a size; the roots of all are in the same state; and, they strike quicker into the ground where they are to stand for a crop.

Put them in rows. Plant as deep as you can without injury to the leaves. As to distances they must be proportioned to the size which the cabbages usually come to. However, for the very small sorts, the early dwarf, and the early sea-green, a foot apart in all directions is enough. The next size is the Early York, which may have 16 inches every way. The sugar-loaf may have 20 inches. The Battersea and Savoy two feet and a half. The large sorts, as the drum-head and others, three feet at least. Now, with regard to tillage, keep the ground clear of weeds. But, whether there be weeds or not, hoe between the plants in ten days after they are planted. All the larger sorts of cabbages should, about the time that their heads are beginning to form, be earthed up; that is, have the earth from the surface drawn up against the stem; and, the taller the plants are, the more necessary this is, and the higher should the earth be drawn. After the earth has been thus drawn up from the surface, dig, or hoe deep the rest of

the ground. Thus the crop will be brought to perfection.

As to the sorts, the earliest is, the early dwarf (sometimes called the early Salisbury); the next is the early sea green; then comes the early York. The sugar-loaf, sweetest and richest of all cabbages, if sown and transplanted when early Yorks are, will head nearly a month later. It is an excellent cabbage to come in in July and August.

For the winter use, there really needs nothing but the dwarf green Savoy. When good and true to kind it is very much curled, and of a very deep green. It should be sown as soon as the ground is at all warm, and planted out as soon as stout enough. By November it will have large and close heads, weighing from five to eight pounds each. This is the best of all winter cabbages. If you have drum-heads, or other large cabbages, the time of sowing and that of transplanting are the same as those for the Savoy. But, let me observe here, that the early sorts of cabbage keep during winter, as well as the large late sorts. It is an error to suppose, that those cabbages only, which will not come to perfection till the approach of winter, will keep well. The early York, sown in June, will be right hard in November, and will keep as well as the drum-head, or any of the coarse and strong-smelling cabbages.

To preserve cabbages in winter, the cellar is a poor place. The barn is worse. The cabbages get putrid to some extent. If green vegetables be not fed from the earth, and be in an unfrozen state, they will either wither or rot. Nothing is nastier than putrid cabbage; and one rotten cabbage will communicate its offensiveness to a whole parcel.

Lay out a piece of ground, four feet wide, and in length proportioned to your quantity of cabbages to be preserved. Dig on each side of it a little trench a foot deep, and throw the earth up on the four-feet bed. Make the top of the bed level and smooth. Lay some poles, or old rails, at a foot apart, long-ways, upon the

bed. Then put some smaller poles, or stout sticks, cross ways on the rails or poles, and put these last at five or six inches apart. Upon these lay corn-stalks, broom corn-stalks, or twigs or brush of trees, not very thick, but sufficiently thick just to cover all over. Make the top flat and smooth. Then, just as the frost is about to lock up the earth, take up the cabbages, knock all dirt out of their roots, take off all dead or yellow looking leaves, and some of the outside leaves beside; put the cabbages, head downwards, upon the bed, with their roots sticking up; and cover them with straw so thick that the top of the roots are nearly covered. Do not pack them quite close. It is better if they do not touch each other much. Lay some bits of wood, or brush-wood, to prevent the straw from blowing off. If the frost catch you, before you have got the cabbages up, cut them off close to the ground, and let the stumps, instead of the roots, stick up through the straw.

Out of this stack you will take your cabbages perfectly green and good in the spring when the frost breaks up; and to this stack you can, at all times in the winter, go with the greatest facility, and get your cabbages for use, which you can to no other species of conservatory that I ever saw or heard of.

Cabbage stumps are also to be preserved; for they are very useful in the spring. You have been cutting cabbages to eat in October and November. You leave the stumps standing, no matter what be the sort. Take them up before the frost sets in; trim off the long roots, and lay the stumps in the ground, in a sloping direction, row behind row, with their heads four or five inches out of ground. When the frost has just set in in earnest, and not before, cover the stumps all over a foot thick or more, with straw, corn-stalks, or evergreen boughs of some sort. As soon as the breaking-up comes, take off the covering, and stir the ground (as soon as dry, by hoeing amongst the stumps. They should be placed in an *early spot;* in one of the warmest places you have,

and they will give you an abundance of fine greens towards the end of April.

Lastly, as to the saving of cabbage seed. The cabbage is a biennial. It brings its flower and its seed the second year. To have cabbage seed, therefore, you must preserve the cabbage, head, root and all, throughout the winter; and this must be done, either in a cellar, or under covering of some sort out of doors; for, the root must be kept in the ground all winter. It is possible, and, I think likely, that seed from the stump is just as good as any; but a single cabbage will give seed enough for any garden for three, four, or five years.

CALABASH.

An annual. Cultivated like the cucumber, which see.

CAMOMILE

Is a medicinal herb of great use. It is a perennial, and, though it may be propagated from seed, it is easiest propagated by parting the roots. One little bit of root will soon make a bed sufficient for a garden. The flowers are used in medicine. They should be gathered before they begin to fade: and be dried in a gentle sun, or in shade; and then put by, in paper bags, in a dry place.

CAPSICUM (OR PEPPERS).

An annual plant, sown early in fine earth, in drills a foot apart, and at six inches apart in the drills. It is handsome as a flower, and its pods are used as a pickle.

CARAWAY.

The seeds are used in cakes. The plant is an annual. Sow in the spring, in fine rich ground, and leave the plants eight inches apart each way.

CARROT.

Read the Article, Beet; for, the same season, same soil, same manure, same preparation for sowing, same distances, same intercultivation, same time of taking up, and mode of preserving the crop, all belong to the carrot. Some fine roots may be carefully preserved to plant out for seed in the spring; and the seed should be taken only from the centre seed-stalks of the carrots; for that is the finest.

The mark of a good kind of seed, is deep-red color of the tap. The paler ones are degenerate; and the yellow ones are fast going back to the wild carrot.

CAULIFLOWER.

It is a cabbage, and the French call it the flower-cabbage. Its head is a lump of rich pulp, instead of being, as a cabbage-head is, a parcel of leaves folding in towards a centre, and lapping over each other. The Cauliflower is an annual plant. It blows, and ripens its seed during the year that it is sown; and, in fact, the part which is eaten, is not, as in the cabbage, a lump of leaves, but the seed stalks, pods, and blossoms, in their embryo and compact state, before they expand. It is the same with Brocoli. Cauliflowers may be had to eat in the fall, or in the spring.

To have Cauliflowers to eat in the spring, that is to say, in June, you must sow them in the fall; for, they will have a certain age before their heads will come. Yet, they are very tender.

To keep them through winter, there must not only be glass, but that glass (except where you have a greenhouse to be kept warm by fire,) must have a covering in severe weather. If you are too backward in sowing, the heads do not begin before the great heat comes; and in that case, they will not head till the fall. Sow (Long Island) first week, or second week in September, in the same manner that you sow cabbages. When the plants have eight leaves, put them in a warm place, in the

natural ground, and do not put much dung in the ground. The back part of the hot-bed ground would be the place

To have Cauliflowers to eat in the fall is a much easier matter: Sow at the same time and in the same manner as you sow early cabbages. Treat the plants in the same way.

CELERY.

The qualities of this plant are universally known. There are three or four sorts. The white, the red, the hollow, and the solid. The hollow white is the best; but the propagation and cultivation of all are the same. The whole of that part of the year, during which the frost is out of the ground, is not a bit too long for the getting of fine celery. The seed, sown in the cold ground in April, will lie six weeks before it comes up. A wheelbarrow full of hot dung, put in a hole in the ground against a wall, or any fence, facing the south, and covered with rich and fine mould, will bring the seed up in two weeks. If you have a hot-bed frame, or a hand-light, the thing is easy. A large flower-pot will bring up out of ground, plants enough for any family. As soon as the plants are three inches high, and it scarcely matters how thick they stand, make a nice little bed in the open free air; make the ground rich and the earth very fine. Here prick out the plants at four inches apart; and, of course, nine in a square foot. They are so very small, that this must be carefully done; and they should be gently watered once, and shaded two days. A bed ten feet long and four wide, will contain 360 plants.

In this bed the plants stand till the middle of July, or thereabouts, when they are to go out into trenches. Make the trenches a foot deep and a foot wide, and put them not less than five feet asunder. The ground that you make the trenches in should not be fresh dug; but be in a solid state, which very conveniently may be.

When you have made your trench, put along it some good rich compost manure, partly consisting of wood ashes. Not dung; or, at least, not dung fresh from the yard; for, if you use that, the celery will be rank and pipy, and will not keep nearly so long or so well. Dig this manure in, and break all the earth very fine as you go. Then take up your plants, and trim off the long roots. You will find that every plant has offsets to it, coming up by the side of the main stem. Pull all these off, and leave only the single stem. Cut the leaves off so as to leave the whole plant about six inches long.

Plant them six inches apart, and fix them in the manner dwelt on under the article cabbage. Do not water the plants; and if you plant in fresh-dug ground, and fix your plants well, none of the troublesome and cumbrous business of shading is at all necessary; for the plant is naturally hardy, and, if it has heat to wither it above, it has also that heat beneath to cause its roots to strike out almost instantly.

When the plants begin to grow, which they quickly will do, hoe on each side and between them with a small hoe. As they grow up, earth their stems; that is, put the earth up to them, but not too much at a time; and let the earth that you put up be finely broken, and not at all cloddy. While you do this, keep the stalks of the outside leaves close up to prevent the earth from getting between the stems of the outside leaves and the inner ones; for, if it get there it checks the plant and makes the celery bad.

Thus in October, you will have four ridges of celery across one of the plats, each containing 168 plants. I shall suppose one of these ridges to be wanted for use before the frost sets in for good. Leave another ridge to be locked up by the frost, a much safer guardian than your cellar or barn-door. But, you must cover this ridge over in such a way that the wet will not get down into the hearts of the celery. For the celery that is to serve from the setting in to the breaking up of the frost, you must have a bed of sand, or light earth, in a warm part of a barn, or in a cellar; and there you must lay it

in, row after row, not covering the points of the leaves. To have seed, take one plant in spring, out of the ridge left in the garden.

CORIANDER

Is an annual plant that some persons use in soups and salads. It is sown in spring. The seed is also used as a medicine. A small patch, probably two square yards, will be enough.

CORN (INDIAN).

To have some early, the early sorts must be got. A dozen or two of plants may be easily raised in pots, as directed for Cucumbers.

CORN-SALAD.

This is a little insignificant annual plant that some persons use in salads, though it can hardly be of any real use, where lettuce seed is to be had. It is a mere weed.

CRESS (OR PEPPER-GRASS),

Is very good in salads along with lettuces, white mustard, or rape. It should be sown in little drills, very thick (as should the white mustard and rape), and cut before it comes into rough leaf. A small quantity, in the salad-season, should be sown every six days. This salad, as well as the mustard and the rape, may be very conveniently raised in a corner of a hot-bed made for radishes or cabbage-plants.

CUCUMBER.

If you wish to have them a month earlier than the natural ground will bring them, make a hole, and put into it a little hot dung; let the hole be under a warm

fence. Put six inches deep of fine rich earth on the dung. Sow a parcel of seeds in this earth; and cover at night with a bit of carpet, or sail cloth, having first fixed some hoops over this little bed.

Before the plants show the rough leaf, plant two in a little flower-pot, and fill as many pots in this way as you please. Have a larger bed ready to put the pots into, and covered with earth so that the pots may be plunged in the earth up to their tops. Cover this bed like the last.

When the plants have got two rough leaves out, they will begin to make a shoot in the middle. Pinch that short off. Let them stand in this bed till your cucumbers sown in the natural ground come up; then make some little holes in good rich land, and taking a pot at a time, turn out the ball and fix it in the hole. These plants will bear a month sooner than those sown in the natural ground.

The cucumber plant is very tender and juicy; and, therefore, when the seedlings are put into the pots, they should be watered, and shaded for a day or two; when the balls are turned into the ground, they should be watered, and shaded with a bough for one day. One plant in a hill is enough. One will bring more weight of fruit than two (if standing near each other), two more than three, and so on, till you come to fifty in a square foot; and then you will have no fruit at all!

HOP.

Any bit of a root will grow and become a plant. The young plants should be planted in the fall, three or four together in a clump, or hill, and the hills should be from seven to ten feet apart. The first year of planting, put four rods, or little poles, to each hill, and let two vines go up each pole, treading the rest of the vines down to creep about the ground. In a month after the vines begin to mount the poles, cut off all the creeping vines; draw up a hill of earth against the poles all round, and cover all the crowns of the plants. In short, make a

hill a foot high with a flattish top, and then fork up the ground between the hills and break it fine.

When the fall comes, cut off the vines that have gone up the pole a foot from the ground; take down the poles; dig down the hills, and, with a corn-hoe, open the ground all round the crowns of the plants; and, before winter sets in, cut all close down to the very crowns, and then cover the crowns over with earth three or four inches thick. Through this earth the hop-shoots will start in the spring. You will want but eight of them to go up your four poles; and the rest, when three inches long, you may cut, and eat as asparagus; cook them in the same manner, and you will find them a very delightful vegetable.

This year you put poles 20 feet long to your hops. Proceed the same as before, only make the hills larger, and this year you will have plenty of hops to gather for use. The next, and every succeeding year, you may put poles 40 or 50 feet long.

HORSE-RADISH.

Like every other plant, this bears seed; but it is best propagated by cutting bits of its roots into lengths of two inches, and putting them, spring or fall, into the ground about a foot deep with a setting stick. They will find their way up the first year; and the second they will be fine large roots.

HYSSOP

Is a sort of shrub, the flower-spikes of which are used, fresh or dried, for medicinal purposes. It is propagated from seed, or from offsets.

LETTUCE.

It is good in stews; good boiled with green peas; and, even as a dish boiled as cabbage is, it is an excellent ve-

table. There are, I believe, twenty sorts, two of which only it will be enough to mention, green-coss and white-coss, the former of which is of a darker green than the latter, is rather hardier, and not quite so good. These, when true to their kind, and in a proper situation, rise up, and fold in their leaves to a solid loaf, like a sugar-loaf cabbage, and, in rich land, with good management, they will become nearly as large.

MARJORAM.

Cut it just before it comes out into bloom, hang it up in little bunches to dry, first for a day, in the sun; then in the shade; and, when quite dry, put it in paper bags, tied up, and the bags hung up in a dry place.

MARIGOLD.

An annual plant. Sow the seed spring or fall; when the bloom is at full, gather the flowers; pull the leaves of the flower out of their sockets; lay them on paper to dry, in the shade. They are excellent in broths, soups, and stews.

MELON.

As to the manner of propagating, cultivating, and sowing the seed of melons, see Cucumber, and only observe, that all that is there said, applies to melons as well as to cucumbers.

MUSTARD.

There is a white-seeded sort and a brown-seeded. The white mustard is used in salads along with the cress, or pepper-grass, and is sown and cultivated in the same way. (See Cress.) The black is that which table-mustard is made of.

It is sown in rows, two feet apart, early in the spring. The plants ought to be thinned to four or five inches

apart. Good tillage between the rows. The seed will be ripe in July, and then the stalks should be cut off, and when quite dry, the seed threshed out, and put by for use.

ONION.

Sow in the fall or early in the spring. Let the ground be rich, but not from fresh dung. Make the ground very fine; make the rows a foot apart, and scatter the seed thinly along a drill two inches deep. When the plants get to be three inches high, thin them to four inches, or to eight inches if you wish to have very large onions. When the leaves are nearly dead, pull up the onions, and lay them to dry, in order to be put away for winter use.

PARSLEY.

It may be sown at any season when the frost is out of the ground. The best way is to sow it in spring, and in very clean ground; because the seed lies long in the ground, and, if the ground be foul the weeds choke the plants at their coming up.

PARSNIP.

The season of sowing, sort of land, preparation of ground, distances, and cultivation, and tillage,are precisely the same as the Carrot, which see.

PEA.

The soil should be good, and fresh dung is good manure for them. Ashes, and compost, are very good. The earliest of all is the little white pea, called in Long Island, the May-pea.

If you sow in the spring, do it as soon as the ground is dry enough to go upon. Sow the May-pea, some Charletons, some Hotspurs, some Blue-peas, some Marrowfats, and some Knight-pea, all at the same time, and

they will come up one after another, so as to give you green peas till nearly August. In June (about the middle), sow some early peas again, and also some Marrowfats and Knight-peas; and these will give you peas till September.

PENNYROYAL.

A medicinal herb. It is perennial.

POTATO.

Every body knows how to cultivate this plant.

POTATO (SWEET).

This plant is cultivated in much the same way as the last. Heat is what it chiefly wants.

PUMPKIN.

See cucumber. The cultivation is the same.

RADISH.

A great variety of sorts. Sown thin in little drills six inches asunder. Sown as early as possible in the spring.

RHUBARB.

It comes forth, like the dock, very early in the spring. When its leaves are pretty large, you cut them off close to the stem, and if the plant be fine, the stalk of the leaf will be from eight inches to a foot long. You peel the outside skin from these stalks, and then cut the stalks up into bits. You put these into puddings, pies, tarts, just as you would green goose-berries, and green currants.

SAGE

Is raised from seed, or from slips.

SAVORY.

Two sorts, summer and winter. The former is annual, and the latter is perennial.

SQUASH

Is, in all its varieties, cultivated like the Cucumber.

TOMATUM.

It climbs up very high, and would require bushy sticks. This fruit is used to thicken stews and soups. It is raised from seed only, being an annual.

TURNIP.

The best kinds of turnips are the early white, the flat yellow, and the Swedish, or ruta-baga. The two former sorts should be sown about the end of July, in rows (in a garden) two feet apart, and thinned out to a foot distance in the rows. The Swedish turnip, so generally preferred for table use, ought to be sown early in June, in rows at a foot apart, and thinned to three inches in the rows. About the middle of July they ought to be transplanted upon ridges three feet apart. For preserving turnips during the winter, follow precisely the directions given for the preserving of Beets. See Beet.

FLOWERS AND ORNAMENTAL GARDENING.

The smaller kinds of flowers, and even small shrubs, such as roses, dwarf honey-suckles, and the like, may be planted by the sides of the broad walks in the kitchen garden, or, a little piece of ground may be set apart for the purpose. In cases where there are what are usually called pleasure-grounds, large shrubs, and if the grounds be extensive, lofty trees come in. And, in the placing of the whole of the trees and plants, the most lofty should be farthest from the walk.

Flowers are divided into annuals, biennials and perennials. The first blow and die the year they are sown; the second blow the second year and then die; the third sometimes blow the first year and sometimes not, and die down to the ground annually, but spring up again every spring.

ALTHEA FRUTEX.

It is raised from seed, or from suckers. There are several sorts, as to colors. They should be mixed to make a variety. Save the seed in November or December. The pods are full. Sow in the spring. Seed produces the handsomest shrub; and it is to be got almost any where.

ANEMONE.

This is a very beautiful flower, and worthy of great pains. It is raised from seed, or from pieces of the roots. Sow the seed in spring. The plant does not blow the

first year. The root, which is tuberous, is taken up in the fall, dried in the sun, and put by in the dry till spring, when it is put into the ground again. And, during the summer, it sends out young roots, which must be taken off and planted out, to become blowers. There is a great variety of colors and of sizes of this flower.

ARBUTUS.

A pretty ever-green, as well known as the oak tree.

ASTRE (CHINA).

Astre is French for star, and this flower in its shape, resembles a star to our view. It is annual, bears great quantities of seed, and is sown early in spring. An infinite variety of colors, and great quantities of blossoms.

AZALIA.

That little American Honeysuckle that impedes our steps when shooting on the skirts of woods. It however, blows profusely, though it has no smell like the English honeysuckle.

BALSAM

Is an annual and a most beautiful plant, with great abundance of flowers. Sow when you sow melons, at a distance of four feet; leave only one plant in a place; let the ground be rich and kept clean; it will blow early in July, and will keep growing and blowing till the frost comes, and then, like the cucumber, it is instantly cut down.

BRIAR (SWEET).

A well known shrub of the rose kind. Bows of it carefully planted and pruned make very good hedges.

CAMILLIA.

It bears a flower, which, when open, resembles a good deal a large full-blown rose; and these flowers, on different plants, are of different colors. It is raised, doubtless, from seed; but it may be grafted on the hawthorn; and, I dare say, on the crab.

CARNATION.

Here is beauty and fragrance, and both in the highest degree. There are various sorts. If sown, the carnation does not blow till the second year. It is usually propagated by layers. While it is blowing, it sends out several side shoots near the ground. These are pinned down in August to the earth, with a little stick with a hook at the end of it. A little cut, or tongue, is made on the under side of the shoot; and thus the head of the shoot is brought upright. The part that touches the ground is well covered with earth; and roots come out here before the fall. Then the stalk, which connects the young plant with the old one is cut off; the young plant is transplanted, and the next year it blows. The old root does not stand another year well; and, therefore, its branches are thus made use of to keep up the race and the sort.

Carnations are rather tender as to frost; and must be well covered in this country to live through the winter. It is best to put them in large pots to give room for laying; and to keep them in a green-house in winter, or in some house, where they can have sun and air.

CLOVE.

It is only a more handy and less esteemed sort or Carnation, which see.

COLUMBINE.

A perennial. Very common; but very pretty.

COWSLIP.

It is of a delicate yellow color, and sends forth many blossoms from the same stem, which rises about six inches from the ground. It may easily be propagated from seed, which it bears in great abundance, but, when you once have a plant, the easiest way is to propagate from offsets. The plants raised from seed do not blow till the second year. The plant is perennial. The flower has a delicate sweet smell, and also sweet taste.

CROCUS.

A bulbous rooted plant. It is recommended by its earliness. It is perfectly hardy. The only thing to do when it is once planted, is to take care that it does not fill all the ground near it. There are yellow, blue, and white Crocuses.

DAISY.

It is a most beautiful little flower, and blows without ceasing at all times when the grass grows. Their colors present an endless variety; and those grown in gardens are double. There is one sort called the Hen-and-chicken Daisy, that has a ring of little flowers surrounding the main flower. This plant may be raised from offsets or seed, in which last case it blows the second year. It is perennial.

GERANIUM

Wants hardiness only to make it the finest flower-plant. The Geranium has a beautiful leaf, beautiful flower, flagrant smell from leaf as well as from flower, and these it has in never-ceasing abundance; and as to variety of sorts, as well in leaf as in flower, it surpasses almost every plant. The geranium is propagated from seed, or from cuttings.

GUELDER-ROSE.

This is called the Snow-ball tree. It is raised either from layers or suckers. Its bloom is of short duration; but for the time makes a great show in shrubbery. The suckers of it ought to be dug clean away every year.

HOLLYHOCK.

This is a fine showy plant for shrubbery. There are double and single, and none but the double should be cultivated. It may be raised from seed, or from offsets. If the former it does not blow till the second year.

HONEYSUCKLE.

Its name indicates its sweetness of taste, and the smell is delightful almost beyond comparison. The plant is also beautiful: it climbs up houses and over hedges; it forms arbors and bowers. It may be propagated from seed; but always is from cuttings; put into the ground in spring, and treat like other wood-cuttings.

HYACINTH.

This is a bulbous-rooted plant, and, like the plants of that class, is perennial. It may be raised from seed. The roots are propagated from off-sets; they do not blow the first year, and if weak, not the second.

ROSES.

It is the queen of flowers. All roses may be propagated from seed; but as the seed seldom comes up till the second year, and as the plants come to perfection slowly, the usual mode of propagation of all sorts, except the China rose, is by suckers. These come out near old stems, during the summer; they are dug up in the fall and planted out. In the spring they are cut down near to the ground, and the next year they blow.

THE HORSE DOCTOR.

BY DR. WM. YOUATT.

INJURIES AND DISEASES OF THE SKULL—THE BRAIN—THE EARS—AND THE EYES.

FRACTURE.

The bones of the head are so exceedingly thick, that a fracture of the skull is almost impossible. It can only occur from brutal violence, or when a horse falls in the act of rearing. When, however, fracture of the skull does occur, it is almost invariably fatal.

The ridge, or outer and upper part of the orbit of the eye, is occasionally fractured. It happens from falling, or much oftener from violent blows. The slightest examination will detect the loosened pieces; but a professional man alone can render effectual assistance.

PRESSURE OF THE BRAIN.

This may be produced by some fluid thrown out between the membranes, or occupying and distending the ventricles of the brain. In the full-grown horse it rarely occurs; but it is well known to breeders as an occasional disease of the foal, under the name of "water in the head."

MEGRIMS.

From various causes, of which the most common is violent exercise on a hot day, when the collar is too small, or the curb-rein too tight—the blood is prevented from returning from the head. The larger vessels of the brain will then be too long and injuriously distended; and, what is of more consequence, the small vessels that permeate the substance of the brain will be enlarged, and the bulk of the brain increased, so that it will press upon the origins of the nerves, and produce, almost without warning, loss of power and consciousness.

The mildest affection of this kind is known by the name of megrims.

At the moment of attack, a person who is competent to the task should abstract three or four quarts of blood from the neck-vein; or cut the bars of the palate, and whence a considerable and sufficient quantity of blood may be readily obtained.

APOPLEXY, OR STAGGERS.

Megrims is Apoplexy under its mildest form. In the latter affection, the determination of blood, if not so sudden, is greater, or differently directed, or more lasting.

Symptoms.—The horse is a little off his feed—he is more than usually dull—there is a degree of stupidity about him, and, generally, a somewhat staggering gait. The last act of voluntary motion which he will attempt is usually to drink; but he has little power over the muscles of deglutition, and the fluid returns through the nostrils.

He now begins to foam at the mouth. His breathing is laborious and loud. It is performed by the influence of the organic nerves, and those of animal life no longer lend their aid.

All the powers of life are oppressed, and death speedily closes the scene.

Treatment.—Bleeding is the first measure indicated —the overloaded vessels of the brain must be relieved. The jugular vein should be immediately opened. It is easily got at—it is large—the blood may be drawn from it in a full stream. No definite quantity of blood should be ordered to be abstracted. The effect produced must be the guide.

PHRENITIS.

Symptoms.—The horse is drowsy, stupid; his eye closes; he sleeps while he is in the act of eating, and doses until he falls.

Remedy.—In a case of evident phrenitis, blood-letting and physic must be early carried to their full extent. The horse will often be materially relieved, and, perhaps, cured by this decisive treatment.

RABIES, OR MADNESS.

Symptoms.—The horse stops all at once—trembles, heaves, paws, staggers, and falls.

In the great majority of cases—or rather, with very few exceptions—a state of excitation ensues, which is not exceeded by that of the dog under the most fearful form of the malady.

The disease rarely extends beyond the third day.

When the disease can be clearly connected with a previous bite, the sooner the animal is destroyed the better, for there is no cure.

TETANUS, OR LOCKED JAW.

Symptoms.—The horse, for a day or two, does not appear to be quite well; he does not feed as usual; he partly chews his food, and drops it; and he gulps his water. The owner can only open the mouth a very little way, or the jaws are perfectly and rigidly closed.

The nostril is expanded to the utmost.

By degrees the spasm extends and becomes everywhere more violent. The motion of the whole frame is lost, and the horse stands fixed in the unnatural posture which he has assumed.

The foot is the most frequent source or focus of tetanic injury. It has been pricked in shoeing, or wounded by something on the road. The horse becomes lame—the injury is carelessly treated, or not treated at all.

Remedy.—The system must be tranquillized. The grand agent in accomplishing this is the copious abstraction of blood. Bleed until the horse falters or falls. Twenty pounds have been taken before the object of the practitioner was accomplished.

Next in order, and equal in importance, is physic.

Eight or ten drachms of aloes should be administered.

CRAMP.

This is a sudden, involuntary and painful spasm of a particular muscle or set of muscles. It differs from tetanus in its shorter duration, and in its occasionally attacking the muscles or organic life.

The attendant on the horse should endeavor to find out the muscle chiefly affected. Give plenty of good hand-rubbing.

STRINGHALT.

This is a sudden and spasmodic action of some of the muscles of the thigh when the horse is first led from the stable. One or both legs are caught up at every step with great rapidity and violence, so that the fetlock sometimes touches the belly; but, after the horse has been out a little while, this usually goes off and the natural action of the animal returns.

PALSY.

The stream of nervous influence is sometimes stopped,

and thence results palsy. Every organ of motion and of sense is paralyzed.

Palsy in the horse generally attacks the hind extremities. It commences generally in one hind leg, or perhaps both are equally affected. The animal can scarcely walk.

Treatment.—Commence with bleeding. Continue until the pulse begins to falter or the horse to reel. To this should follow a dose of physic—strong, compared with the size of the animal. The loins should be covered with a mustard poultice frequently renewed. The patient should be warmly clothed, supplied plentifully with mashes, but without a grain of corn in them; and frequent injections should be had recourse to.

RHEUMATISM.

The lameness is frequently excessive, and the pain is evidently excruciating. He is heaving at the flanks, sweating profusely, his countenance plainly indicative of the agony he feels; but there is at first no heat, or swelling, or tenderness.

Mr. Cooper, of Coleshill, relates a case very applicable to the present subject: A farmer purchased a horse, to all appearances sound. He was worked on the two following days, without showing the least lameness. On the third day it was with great difficulty that he managed to limp out of the stable. The horse had clean legs and excellent feet. The owner would have him blistered all around. It was done. The horse was turned out to grass for two months, and came up perfectly sound.

SPECIFIC OPHTHALMIA, OR MOON-BLINDNESS.

Should three or four days pass, and the inflammation not be abated, we may begin to suspect that it is ophthalmia, especially if the eye is very impatient of light, and the cornea is considerably clouded. Even the iris

changes its color, and the pupil is exceedingly contracted.

Finally, deeply-seated cloudiness begins to appear; and after repeated attacks and alternations of disease from eye to eye, the affair terminates in opacity of the lens or its capsule, attended with perfect blindness either of one eye or both.

Remedy.—Foment the eyes with warm water, or apply cold lotions with the extract of lead or opium, or poultices to which these drugs may be added; bleed—not from the temporal artery, for that does not supply the orbit of the eye, but from the angular vein, at the inner corner of the eye. Place a seton in the cheek, or towel under the jaw, and keep the animal low, and give physic or fever medicine.

NASAL POLYPUS.

By the polypus, is meant an excrescence or tumor, varying in size, structure, and consistence, and attached by a pedicle to a mucous surface. The true polypus is attached to mucous membranes, and is usually found in the nostrils, the pharynx, the uterus, or the vagina.

How is the surgeon to proceed? If he cannot fairly get at the tumor he will let it alone. The polypus will at length descend, and be easily got at. The tumor must be gently brought down, and a ligature passed round the pedicle, as high up as it can conveniently be placed.

If the polypus is so large that it cannot well be returned after it has been brought down, he must, notwithstanding, use the ligature, passing it around the pedicle sufficiently tight to cut off the supply of blood to the tumor. He may then immediately excise it. Except the pedicle is exceedingly thick, there will be little or no hæmorrhage.

GLANDERS.

The most formidable of all the diseases to which the horse is subject, is glanders.

The earliest symptom of glanders is an increased discharge from the nostril, small in quantity, constantly flowing, of an aqueous character, and a little mucus mingling with it.

The peculiar viscidity and gluiness which is generally supposed to distinguish the discharge of glanders from all other mucous and prevalent secretions belong, to the second stage of the disease.

In process of time, however, pus mingles with the discharge. The neighboring glands become affected. Spots of ulceration will probably appear on the membrane covering the cartilage of the nose. The patient loses flesh—his belly is tucked up—his coat unthrifty, and readily coming off—the appetite is impaired—the strength fails—cough, more or less urgent, may be heard —ths discharge from the nose will increase in quantity; it will be discolored, bloody, offensive to the smell—the ulcers in the nose will become larger and more numerous, and the air-passages being obstructed, a grating, choking noise will be heard at every act of breathing.

At or before this time, little tumors appear about the muscles, and face and neck; and these, the tumors soon ulcerate.

The deeper-seated absorbents are next affected; and one or both of the hind-legs swell to a great size, and become stiff, and hot, and tender. The animal presents one mass of putrefaction, and at last dies exhausted.

Improper stable management we believe to be a far more frequent cause of glanders than contagion.

Among the causes of glanders is want of regular exercise.

There is not a disease which may not lay the foundation for glanders.

The disease may be very readily communicated. One

horse has passed another when he was in the act of snorting, and has become glandered.

As for medicine, there is scarcely a drug to which a fair trial has not been given, and many of them have had a temporary reputation. The blue vitriol and the Spanish fly have held out the longest.

If, however, remedial measures are resorted to, a pure atmosphere is that which should first be tried.

Little that is satisfactory can be said of the prevention of glanders.

The first and most effectual mode of prevention will be to keep the stables cool and well ventilated, for the hot and poisoned air of low and confined stables is one of the most prevalent causes of glanders.

Glanders in the human being.—It cannot be too often repeated, that a glandered horse can rarely remain among sound ones without serious mischief ensuing; and, worse than all, the man who attends on that horse is in danger. The cases are now becoming far too numerous in which the groom or the veterinary surgeon attending on glandered horses becomes infected, and in the majority of cases dies. It is, however, somewhat more manageable in the human being than in the quadruped. Some cases of recovery from farcy and glanders stand on record with regard to the human being, but they are few and far between.

STRANGLES.

It is preceded by cough, and can at first be scarcely distinguished from common cough, except that there is more discharge from the nostril, of a yellowish color, mixed with pus, and generally without smell.

There is likewise a considerable discharge of ropy fluid from the mouth, and greater swelling than usual under the throat.

In the attempt to swallow, and sometimes when not drinking, a convulsive cough comes on, which almost

threatens to suffocate the animal—and thence, probably, the name of the disease.

The tumor is under the jaw, and about the centre of the channel.

Treatment.—As soon as the tumor of strangles is decidedly apparent, the part should be actively blistered. A blister will not only secure the completion of the process, but hasten it by many days, and save the patient much pain and exhaustion. As soon as the swelling is soft on its summit, and evidently contains matter, it shoule be freely and deeply lanced.

If there is much fever, it will be proper to bleed. In the majority of cases, however, bleeding will not only be unnecessary, but injurious.

Bran-mashes, or fresh-cut grass or tares, should be liberally supplied, which will not only afford sufficient nourishment to recruit the strength of the animal, but keep the bowels gently open.

CATARRH, OR COLD.

Catarrh, or Cold, is attended by a slight defluxion from the nose—now and then, a slighter weeping from the eyes, and some increased labor of breathing, on account of the uneasiness which the animal experiences from the passage of the air over the naturally sensitive, and now more than usually irritable surface, and from the air-passage being diminished by a thickening of the membrane.

In the majority of cases, a few warm mashes, warm clothing, and a warm stable—a fever-ball or two, with a drachm of aloes in each, and a little antimony in the evening will set all right.

CHRONIC COUGH.

It is sometimes connected with worms. There is much sympathy between the lungs and the intestines,

and the one readily participates in the irritation produced in the other.

If a hard hollow cough is accompanied by a staring coat, and the appearance of worms,—a few worm-balls may expel these parasites and remove the irritation of the intestinal canal. If it proceeds from irritability of the air-passages, which will be discovered by the horse coughing after drinking, or when he first goes out of the stable in the morning, or by his occasionally snorting out thick mucus from the nose, medicines may be given, and sometimes with advantage, to diminish irritation generally. Small doses of digitalis, emetic tartar, and nitre, administered every night, frequently have a beneficial effect, especially when mixed with tar, which seems to have a powerful influence in allaying the irritation.

Feeding has much influence on this complaint. Too much dry meat, and especially chaff, increases it.

When chronic cough chiefly occurs after eating, the seat of the disease is evidently in the substance of the lungs.

The two most frequent consequences of severe chest affections in the horse are recognised under the terms *thick wind* and *broken wind*. The breathing is hurried in both, and the horse is generally much distressed when put upon his speed; but it is simply quick breathing in the first, with a peculiar sound like half-roaring —the inspirations and expirations being rapid, forcible, but equal.

Broken-wind is preceded or accompanied by cough — short—seemingly cut short—grunting, and followed by wheezing. Broken-wind is usually preceded by cough; the cough becomes chronic, leads on to thick-wind, and then there is but a step to broken-wind.

Is there any cure for broken-wind? None! No medical skill can repair the broken-down structure of the lungs.

If, however, we cannot cure, we may in some degree palliate broken-wind; and, first of all, we must attend

carefully to the feeding. The food should lie in little compass—plenty of oats and little hay, but no chaff. Green meat will always be serviceable. Carrots are particularly useful.

Next in importance stands exercise.

The wheezer utters a sound not unlike that of an asthmatic person when a little hurried. This is a kind of thick wind, and is caused by the lodgment of some mucus fluid in the small passages of the lungs. It frequently accompanies bronchitis. Wheezing can be heard at all times, even when the horse is at rest in the stable; roaring is confined to the increased breathing of considerable exertion.

PHTHISIS PULMONALIS, OR CONSUMPTION.

What is the medical treatment of confirmed phthisis, or consumption? The practitioner must be guided by circumstances. If the horse is not very bad, and it is the spring of the year, a run at grass may be tried.

The medical treatment, if any is tried, will depend on two simple and unerring guides, the pulse and the membrane of the nose. If the first is quick and hard, and the second streaked with red, *venesection* should be resorted to. Small bleedings of one or two quarts, omitted when the pulse is quieted and the nostril is pale, may be effected. Counter-irritants will rarely do harm. They should be applied in the form of blisters, extending over the sides.

Sedative medicines should be perseveringly administered.

Nitre may be added as a diuretic, and *pulvis antimonialis* as a diaphoretic.

BOTS.

The bots cannot, while they inhabit the stomach of the horse, give the animal any pain, for they have fastened on the cuticular and insensible coat. They can-

not be removed by medicine, because they are not in that part of the stomach to which medicine is usually conveyed; and, last of all, in due course of time, they detach themselves, and come away.

SPASMODIC COLIC.

The attack of colic is usually very sudden. The horse begins to shift his posture, look round at his flanks, paw violently, strike his belly with his feet, and crouch in a peculiar manner, advancing his hind limbs under him; he will then suddenly lie, or rather fall down, and balance himself upon his back, with his feet resting on his belly. In the space of an hour or two, either the spasms begin to relax, and the remissions are of longer duration, or the torture is augmented at every paroxysm; the intervals of ease are fewer and less marked, and inflammation and death supervene.

Among the causes of colic are, the drinking of cold water when the horse is heated.

Remedy.—Turpentine is one of the most powerful remedies, especially in union with opium, and in good warm ale.

If relief is not obtained in half an hour, it will be prudent to bleed, for the continuance of violent spasm may produce inflammation.

The belly should be well rubbed with a brush or warm cloth. The horse should be walked about, or trotted moderately.

Clysters of warm water, or containing a solution of aloes, should be injected.

HERNIA, OR RUPTURE.

A portion of the intestine protrudes out of the cavity of the belly, either through some natural or artificial opening. In some cases it may be returned, but, from the impossibility of applying a truss or bandage, it soon escapes again. At other times, the opening is so nar-

row, that the gut, gradually distended by fæces, or thickened by inflammation, cannot be returned, and strangulated hernia is then said to exist.

The assistance of a veterinary surgeon is here indispensable.

JAUNDICE, OR YELLOWS.

It is the introduction of bile into the general circulation.

The yellowness of the eyes and mouth, and of the skin where it is not covered with hair, mark it sufficiently plainly. The offal is small and hard; the urine highly colored; the horse languid, and the appetite impaired.

The principal causes are over-feeding or over-exertion in sultry weather, or too little work generally speaking, or inflammation or other diseases of the liver itself.

Bleeding should always be resorted to, regulated according to the apparent degree of inflammation of the bowels and lungs, and the occasional stupor of the animal. Plenty of water slightly warmed, or thin gruel, should be given. The horse should be warmly clothed, and the stable well ventilated, but not cold. Carrots or green meat will be very beneficial.

BREEDING, CASTRATION, &C.

It should be impressed on the minds of breeders, that peculiarity of form and constitution are inherited from both parents.

The mare should be long, in order to give room for the growth of the fœtus; and yet there should be compactness of form and shortness of leg.

As to the shape of the stallion little satisfactory can be said. If there is one point absolutely essential, it is "compactness."

From the time of covering, to within a few days of

the expected period of foaling, the cart-mare may be kept at moderate labor.

When nearly half the time of pregnancy has elapsed, the mare should have a little better food. She should be allowed one or two feeds of corn in the day.

The parturition being over, the mare should be turned into some well-sheltered pasture, with a hovel or shed to run into when she pleases.

In five or six months, according to the growth of the foal, it may be weaned.

There is no principle of greater importance than the liberal feeding of the foal during the whole of his growth, and at this time in particular.

CASTRATION.

For the common agricultural horse the age of four or five months will be the most proper time, or, at least before he is weaned. Few horses are lost when cut at that age. Care, however, should be taken that the weather is not too hot, nor the flies too numerous.

If the horse is designed either for the carriage or for heavy draught, the farmer should not think of castrating him until he is at least twelve months old.

The manner in which the operation is performed will be properly left to the veterinary surgeon.

RINGBONE.

Ringbone is a deposit of bony matter in one of the pasterns, and usually near the joint. It rapidly spreads, and involves not only the pastern-bones, but the cartilages of the foot, and spreading around the pasterns and cartilages, thus derives its name.

The pasterns first become connected together by bone instead of ligament, and thence results what is called an anchlosed or fixed joint. From this joint the disease proceeds to the cartilages of the foot, and to the union between the lower pastern, and the coffin and navicular

bones. The motion of these parts likewise is impeded or lost, and the whole of the foot becomes one mass of spongy bone.

SWELLED LEGS.

Sometimes from an apparent shifting of disease from other parts, the hind legs suddenly swell to an enormous degree from the hock and almost from the stifle to the fetlock, attended by a greater or less degree of heat, and tenderness of the skin, and sometimes excessive and very peculiar lameness.

Occasionally the horse is apparently well at night, but, on the following morning, one or both of the legs are tremendously swollen.

Many horses, in seemingly perfect health, if suffered to remain several days without exercise, will have swelled legs.

Remedy.—Physic or diuretics, or both. must be had recourse to. Mild cases will generally yield to their influence.

THE VICES AND DISAGREEABLE OR DANGEROUS HABITS OF THE HORSE.

The horse has many excellent qualities, but he has likewise defects, and those occasionally amounting to vices.

RESTIVENESS.

At the head of all the vices of the horse is restiveness, the most annoying and the most dangerous of all. Whether it appears in the form of kicking, or rearing, or plunging, or bolting, or in any way that threatens danger to the rider or the horse, it rarely admits of cure.

BACKING OR GIBBING.

One kind of restiveness is backing or gibbing. Some horses have the habit of backing at first starting, and that more from playfulness than desire of mischief. A moderate application of the whip will usually be effec tual. Others, even after starting, exhibit considerable obstinacy and viciousness. This is frequently the effect of bad breaking. Either the shoulder of the horse had been wrung when he was first put to the collar, or he had been foolishly accustomed to be started in the break up-hill, and therefore, all his work coming upon him at once, he gradually acquired the dangerous habit.

A hasty and passionate breaker will often make a really good-tempered young horse an inveterate gibber. Every young horse is at first shy of the collar. If he is too quickly forced to throw his weight into it, he will possibly take a dislike to it, that will occasionally show itself in the form of gibbing as long as he lives. The judicious horse-breaker will resort to no severity, even if the colt should go out several times without even touching collar. The example of his companion will ultimately induce him to take to it voluntarily and effectually.

A large and heavy stone should be put behind the wheel before starting, when the horse finding it more difficult to back than to go forward, will gradually forget this unpleasant trick. It will likewise be of advantage, as often as it can be managed, so to start that the horse shall have to back up hill. The difficulty of accomplishing this will soon make him readily go forward. A little coaxing or leading, or moderate flagellation, will assist in accomplishing the cure.

When, however, a horse, thinking he has had enough of work, or has been improperly checked or corrected, or beginning to feel the painful pressure of the collar, swerves, gibs, and backs, it is a more serious matter. Persuasion should first be tried; and afterwards, reason-

able coercion, but no cruelty; for the brutality which is often exercised in attempting to compel a gibbing horse to throw himself habitually into the collar, never yet accomplished the purpose. The horse may, perhaps, be whipped into motion; but if he has once begun to gib, he will have recourse to it again whenever any circumstance displeases or annoys him, and the habit will be so rapidly and completely formed, that he will become insensible to all severity.

It is useless and dangerous to contend with a horse determined to back, unless there is plenty of room, and by tight reining, the driver can make him back in the precise direction he wishes, and especially up hill. Such a horse should be immediately sold, or turned over to some other work. In a stage-coach as a wheeler, and particularly as the near-wheeler; or, in the middle of a team at agricultural work, he may be serviceable. It will be useless for him to attempt to gib there, for he will be dragged along by his companions whether he will or not; and, finding the inutility of resistance, he will soon be induced to work as well as any horse in the team. The reformation will last while he is thus employed, but like restiveness generally, it will be delusive when the horse returns to his former occupation. The disposition to annoy will very soon follow the power to do it. Some instances of complete reformation may have occurred, but they are rare.

When a horse, not often accustomed to gib, betrays a reluctance to work, common sense and humanity will demand that some consideration should be taken before measures of severity are resorted to. The horse may be taxed beyond his power. He soon discovers whether this is the case, and by refusing to proceed, tells his driver that it is so. The utmost cruelty will not induce many horses to make the slightest effort, when they are conscious that their strength is inadequate to the task. Sometimes the withers are wrung, and the shoulders sadly galled, and the pain, which is intense on level ground, and with fair draught, becomes insupportable

when he tugs up a steep acclivity. These things should be examined into, and, if possible, rectified; for, under such circumstances, cruelty may produce obstinacy and vice, but not willing obedience.

They who are accustomed to horses know what seemingly trivial circumstances occasionally produce this vice. A horse, whose shoulders are raw, or have frequently been so, will not start with a cold collar. When the collar has acquired the warmth of the parts on which it presses, the animal will go without reluctance. Some determined gibbers have been reformed by constantly wearing a false collar, or strip of cloth round the shoulders, so that the coldness of the usual collar should never be felt; and others have been cured of gibbing by keeping the collar on night and day, for the animal is not able to lie down completely at full length, which the tired horse is always glad to do. When a horse gibs, not at starting, but while doing his work, it has sometimes been useful to line the collar with cloth instead of leather; the perspiration is readily absorbed, the substance which presses on the shoulders is softer, and it may be far more accurately eased off at a tender place.

BITING.

This is either the consequence of natural ferocity, or a habit acquired from the foolish and teasing play of grooms and stable-boys. When a horse is tickled and pinched by thoughtless and mischievous youths, he will first pretend to bite his tormentors; by degrees he will proceed farther, and actually bite them, and very soon after that, he will be the first to challenge to the combat, and without provocation, seize some opportunity to gripe the incautious tormentor. At length, as the love of mischief is a propensity too easily acquired, this war, half playful and half in earnest, becomes habitual to him, and degenerates into absolute viciousness.

It is not possible to enter the stall of some horses without danger. The animal gives no warning of his inten-

tion; he is seemingly quiet and harmless: but if the incautious by-stander comes fairly in his reach, he darts upon him, and seldom fails to do some mischief. A stallion addicted to biting is a most formidable creature. He lifts the intruder—he shakes him—he attacks him with his feet—he tramples upon him, and there are many instances in which he effects irreparable mischief. A resolute groom may escape. When he has once got firm hold of the head of the horse, he may back him, or muzzle him, or harness him; but he must be always on his guard, or in a moment of carelessness, he may be seriously injured.

It is seldom that anything can be done in the way of cure. Kindness will aggravate the evil, and no degree of severity will correct it. "I have seen," says Professor Stewart, "biters punished until they trembled in every joint, and were ready to drop, but have never in any case known them cured by this treatment, or by any other. The lash is forgotten in an hour, and the horse is as ready and determined to repeat the offence as before. He appears unable to resist the temptation, and in its worst form biting is a species of insanity."

Prevention, however, is in the power of every proprietor of horses. While he insists on gentle and humane treatment of his cattle, he should systematically forbid this horse-play. It is that which can never be considered as operating as a reward, and thereby rendering the horse tractable; nor does it increase the affection of the animal for his groom, because he is annoyed and irritated by being thus incessantly teased.

GETTING THE CHEEK OF THE BIT INTO THE MOUTH.

Some horses that are disposed to be mischievous, try to do this, and are very expert at it. They soon find what advantage it gives them over their driver, who by this manœuvre loses almost all command. Harsh treatment is here completely out of the question. All that can be done is, by some mechanical contrivance, to ren-

der the thing difficult or impossible, and this may be managed by fastening a round piece of leather on the inside of the cheek of the bit.

KICKING.

This, as a vice, is another consequence of the culpable habit of grooms and stable-boys of teasing the horse. That which is at first an indication of annoyance at the pinching and tickling of the groom, and without any design to injure, gradually becomes the expression of anger, and the effort to do mischief. The horse likewise too soon recognizes the least appearance of timidity, and takes advantage of the discovery. There is no cure for this vice; and he cannot be justified who keeps a kicking horse in his stable.

Some horses acquire, from mere irritability and fidgetiness, a habit of kicking at the stall or the bail, and particularly at eight. The neighboring horses are disturbed, and the kicker gets swelled hocks, or some more serious injury. This is also a habit very difficult to correct if suffered to become established. Mares are far more subject to it than horses.

Before the habit is inveterately established, a thorn bush or a piece of furze fastened against the partition or post, will sometimes effect a cure. When the horse finds that he is pretty severely pricked, he will not long continue to punish himself. In confirmed cases it may be necessary to have recourse to the log, but the legs are often not a little bruised by it. A rather long and heavy piece of wood attached to a chain has been buckled above the hock, so as to reach about half-way down the leg. When the horse attempts to kick violently, his leg will receive a severe blow: this, and the repetition of it, may, after a time, teach him to be quiet.

A much more serious vice is kicking in harness. From the least annoyance about the rump or quarters, some horses will kick at a most violent rate, and destroy the bottom of the chaise, and endanger the limbs of the

driver. Those that are fidgety in the stable are most apt to do this. If the reins should perchance get under the tail, the violence of the kicker will often be most outrageous; and while the animal presses down his tail so tightly that it is almost impossible to extricate the reins, he continues to plunge until he has demolished everything behind him.

This is a vice standing foremost in point of danger, and which no treatment will always conquer. It will be altogether in vain to try coercion. If the shafts are very strong and without flaw, or if they are plated with iron underneath, and a stout kicking-strap resorted to which will barely allow the horse the proper use of his hind limbs in progression, but not permit him to raise them sufficiently for the purpose of kicking, he may be prevented from doing mischief; or if he is harnessed to a heavy cart, and thus confined, his efforts to lash out will be restrained: but it is frequently a very unpleasant thing to witness these attempts, though ineffectual, to demolish the vehicle, for the shafts or the kicking-strap may possibly break, and extreme danger may ensue. A horse that has once begun to kick, whatever may have been the original cause of it, can never be depended upon again, and he will be very unwise who ventures behind him. The man, however, who must come within reach of a kicker, should come as close to him as possible. The blow may thus become a push, and seldom is injurious.

UNSTEADINESS WHILE BEING MOUNTED.

When this merely amounts to eagerness to start—very unpleasant, indeed, at times, for many a rider has been thrown from his seat, before he was fairly fixed in it—it may be remedied by an active and good horseman. We have known many instances in which, while the elderly, and inactive, and fearful man, has been making more than one ineffectual attempt to vault into the saddle, the horse has been dancing about to his annoyance and danger; but the animal had no sooner

been transferred to the management of a younger and more agile rider than he became perfectly subdued. Severity will here, more decidedly than in any other case, do harm. The rider should be fearless—he should carelessly and confidently approach the horse, mount at the first effort, and then restrain him for a while; patting him, and not suffering him to proceed until he becomes perfectly quiet. Horses of this kind should not be too highly fed, and should have sufficient daily exercise.

When the difficulty of mounting arises, not from eagerness to start, but unwillingness to be ridden, the sooner that horse is disposed of the better. He may be conquered by a skilful and determined horseman; but even he will not succeed without frequent and dangerous contests that will mar all the pleasure of the ride.

REARING.

This sometimes results from playfulness, carried, indeed, to an unpleasant and dangerous extent; but it is oftener a desperate and occasionally successful effort to unhorse the rider, and consequently a vice. The horse that has twice decidedly and dangerously reared, should never be trusted again, unless, indeed, it was the fault of the rider, who had been using a deep curb and a sharp bit. Some of the best horses will contend against these, and then rearing may be immediately and permanently cured by using a snaffle-bridle alone.

The horse-breaker's remedy, that of pulling the horse backward on a soft piece of ground, should be practised by reckless and brutal fellows alone. Many horses have been injured in the spine, and others have broken their necks, by being thus suddenly pulled over; while even the fellow, who fears no danger, is not always able to extricate himself from the falling horse. If rearing proceeds from vice, and is unprovoked by the bruising and laceration of the mouth, it fully partakes of the inveteracy which attends the other divisions of restiveness.

RUNNING AWAY.

Some headstrong horses will occasionally endeavor to bolt with the best rider. Others with their wonted sagacity endeavor thus to dislodge the timid or unskilful one. Some are hard to hold, or bolt only during the excitement of the chase; others will run away, prompted by a vicious propensity alone. There is no certain cure here. The method which affords any probability of success is, to ride such a horse with a strong curb and sharp bit; to have him always firmly in hand; and, if he will run away, and the place will admit of it, to give him (sparing neither curb, whip, nor spur,) a great deal more running than he likes.

VICIOUS TO CLEAN.

It would scarcely be credited to what an extent this exists in some horses that are otherwise perfectly quiet. It is only at great hazard that they can be cleaned at all, The origin of this is probably some maltreatment. There is, however, a great difference in the sensibility of the skin in different horses. Some seem as if they could scarcely be made to feel the whip, while others cannot bear a fly to alight on them without an expression of annoyance. In young horses the skin is peculiarly delicate. If they have been curried with a broken comb, or hardly rubbed with an uneven brush, the recollection of the torture they have felt, makes them impatient, and even vicious, during every succeeding operation of the kind. Many grooms, likewise, seem to delight in producing these exhibitions of uneasiness and vice; although, when they are carried a little too far, and at the hazard of the limbs of the groom, the animals that have been almost tutored into these expressions of irritation are brutally kicked and punished.

This, however, is a vice that may be conquered. If the horse is dressed with a lighter hand, and wisped rather than brushed, and the places where the skin is most sensitive are avoided as much as thorough clean-

liness will allow, he will gradually lose the recollection of former ill-treatment, and become tractable and quiet.

VICIOUS TO SHOE.

The correction of this is more peculiarly the business of the smith; yet the master should diligently concern himself with it, for it is oftener the consequence of injudicious or bad usage than of natural vice. It may be expected that there will be some difficulty in shoeing a horse for the first few times. It is an operation that gives him a little uneasiness.

The man to whom he is most accustomed should go with him to the forge; and if another and steady horse is shod before him, he may be induced more readily to submit. It cannot be denied that, after the habit of resisting this necessary operation is formed, force may sometimes be necessary to reduce our rebellious servant to obedience; but we unhesitatingly affirm that the majority of horses vicious to shoe, are rendered so by harsh usage, and by the pain of correction being added to the uneasiness of shoeing. It should be a rule in every forge, that no smith should be permitted to strike a horse, much less to twitch or to gag him, without the master-farrier's order; and that a young horse should never be twitched or struck. There are few horses that may not be gradually rendered manageable for this purpose by mildness and firmness in the operator. They will soon understand that no harm is meant, and they will not forget their usual habit of obedience; but if the remembrance of corporeal punishment is connected with shoeing, they will always be fidgety, and occasionally dangerous.

This is a very serious vice, for it not only exposes the animal to occasional severe injury from his own struggles, but also from the correction of the irritated smith, whose life being in jeopardy, may be forgiven if he is sometimes a little too hard-handed. Such a horse is very liable, and without any fault of the smith, to be pricked and lamed in shoeing; and if the habit should be con-

firmed, and should increase, and it at length becomes necessary to cast him, or put him in the trevis, the owner may be assured that many years will not pass ere some formidable or fatal accident will take place. If, therefore, mild treatment will not correct this vice, the horse cannot be too soon got rid of.

Horses have many unpleasant habits in the stable and on the road, which cannot be said to amount to vice, but which materially lessen their value.

SWALLOWING WITHOUT GRINDING.

Some greedy horses habitually swallow their corn without properly grinding it, and the power of digestion not being adequate to the dissolving of the husk, no nutriment is extracted, and the oats are voided whole. This is particularly the case when horses of unequal appetite feed from the same manger. The greedy one, in his eagerness to get more than his share, bolts a portion of his corn whole. If the farmer, without considerable inconvenience, could contrive that every horse shall have his separate division of the manger, the one of smaller appetite and slower feed would have the opportunity of grinding at his leisure, without the fear of the greater share being stolen by his neighbor.

Some horses, however, are naturally greedy feeders, and will not, even when alone, allow themselves time to chew or grind their corn. In consequence of this they carry but little flesh, and are not equal to severe work. If the rack is supplied with hay when the corn is put into the manger, they will continue to eat on, and their stomachs will become distended with half-chewed and indigestible food. In consequence of this they will be incapable of considerable exertion for a long time after feeding, and, occasionally, dangerous symptoms of staggers will occur.

The remedy is, not to let such horses fast too long. The nose-bag should be the companion of every considerable journey. The food should likewise be of such a nature that it cannot be rapidly bolted. Chaff should

be plentifully mixed with the corn, and, in some cases and especially in horses of slow work, it should with the corn, constitute the whole of the food; and then there will not be much danger.

In every case of this kind the teeth should be carefully examined. Some of them may be unduly lengthened, particularly the first of the grinders: or they may be ragged at the edges, and may abrade and wound the cheek. In the first place the horse cannot properly masticate his food; in the latter he will not; for these animals, as too often happens in sore throat, would rather starve than put themselves to much pain.

CRIB-BITING.

This is a very unpleasant habit, and a considerable defect, although not so serious a one as some have represented. The horse lays hold of the manger with his teeth, violently extends his neck, and then, after some convulsive action of the throat, a slight grunting is heard, accompanied by a sucking or drawing in of air. It is not an effort at simple belching, arising from indigestion. It is the inhalation of air. It is that which takes place with all kinds of diet, and when the stomach is empty as well as when it is full.

The effects of crib-biting are plain enough. The teeth are injured and worn away, and that, in an old horse, to a very serious degree. A considerable quantity of corn is often lost, for the horse will frequently crib with his mouth full of it, and the greater part will fall over the edge of the manger. Much saliva escapes while the manger is thus forcibly held, the loss of which must be of serious detriment in impairing the digestion. The crib-biting horse is notoriously more subject to colic than other horses, and to a species difficult of treatment and frequently dangerous. Although many a crib-biter is stout and strong, and capable of all ordinary work, these horses do not generally carry so much flesh as others, and have not their endurance. On these accounts crib-biting has very properly been decided to be

unsoundness We must not look to the state of the disease at the time of purchase . The question is, does it exist at all? A case was tried before Lord Tenterden, and thus decided: "a horse with crib-biting is unsound."

It is one of those tricks which are exceedingly contagious. Every companion of a crib-biter in the same stables is likely to acquire the habit, and it is the most inveterate of all habits. The edge of the manger will in vain be lined with iron, or with sheep-skin, or with sheep-skin covered with tar or aloes, or any other unpleasant substance. In defiance of the annoyance which these may occasion, the horse will persist in the attack on his manger. A strap buckled tightly round the neck, by compressing the wind-pipe, is the best means of preventing the possibility of this trick; but the strap must be constantly worn, and its pressure is too apt to produce a worse affection, viz: an irritation in the wind pipe, which terminates in roaring.

Some have recommended turning out for five or six months; but this has never succeeded except with a young horse, and then rarely. The old crib-biter will employ the gate for the same purpose as the edge of his manger, and we have often seen him galloping across a field for the mere object of having a gripe at a rail. Medicine will be altogether thrown away in this case.

The only remedy is a muzzle, with bars across the bottom; sufficiently wide to enable the animal to pick up his corn and pull his hay, but not to grasp the edge of the manger. If this is worn for a considerable period, the horse may be tired of attempting that which he cannot accomplish, and for a while forget the habit, but, in a majority of cases, the desire of crib-biting will return with the power of gratifying it.

The causes of crib-biting are various, and some of them beyond the control of the proprietor of the horse. It is often the result of imitation; but it is more frequently the consequence of idleness. The high-fed and spirited horse must be in mischief if he is not usefully employed. Sometimes, but we believe not often, it is produced by partial starvation, whether in a bad straw-

yard, or from unpalatable food. An occasional cause of crib-biting is the frequent custom of grooms, even when the weather is not severe, of dressing them in the stable.

The horse either catches at the edge of the manger, or at that of the partition on each side, if he has been turned, and thus he forms the habit of laying hold of these substances on every occasion.

NOT LYING DOWN.

It not uncommonly happens that a horse will seldom or never lie down in the stable. He sometimes continues in apparent good health, and feeds and works well; but generally his legs swell, or he becomes fatigued sooner than another horse. If it is impossible to let him loose in the saddle, or to put him into a spare box, we know not what is to be done. No means, gentle or cruel, will force him to lie down. The secret is that he is tied up, and either has never dared to lie down through fear of the confinement of the halter, or he has been cast in the night, and severely injured. If he can be suffered to range the stable, or have a comfortable box, in which he may be loose, he will usually lie down the first night. Some few horses, however, will lie down in the stable, and not in a loose box. A fresh, well-made bed will generally tempt the tired horse to refresh himself with sleep.

OVERREACH.

This unpleasant noise, known also by the term "clicking," arises from the toe of the hind foot knocking against the shoe of the fore foot. In the trot, one fore leg and the opposite hind leg are first lifted from the ground and moved forward, the other fore leg and the opposite hind leg remains fixed; but, to keep the centre of gravity within the base, and as the stride, or space passed over by these legs, is often greater than the distance between the fore and hind feet, it is necessary that the fore feet should be alternately moved out of the

way for the hind ones to descend. Then, as occasionally happens with horses not perfectly broken, and that have not been taught their paces, and especially if they have high hinder quarters and low fore ones, if the fore feet are not raised in time, the hind feet will strike them. The fore foot will generally be caught when it has just begun to be raised, and the toe of the hind foot will meet the middle of the bottom of the fore foot. It is an unpleasant noise, and not altogether free from danger; for it may so happen that a horse, the action of whose feet generally so much interferes with each other, may advance the hind foot a little more rapidly, or raise the fore one a little more slowly, so that the blow may fall on the heel of the shoe, and loosen or displace it; or the two shoes may be locked together, and the animal may be thrown; or the contusion may be received even higher, and on the tendons of the leg, and considerable swelling and lameness will follow.

If the animal is young, the action of the horse may be materially improved; otherwise nothing can be done, except to keep the toe of the hind foot as short and as round as it can safely be, and to bevel off and round the toe of the shoe, like that which has been worn by a stumbler for a fortnight, and, perhaps, a little to lower the heel of the fore foot.

A blow received on the head of the fore foot in this manner, has not unfrequently, and especially if neglected, been followed by quittor.

The heel most frequently suffers in overreaching, although the pastern is sometimes injured. It usually, or almost always, occurs in fast paces on deep ground. The injury is inflicted by the edge of the inner part of the shoe. The remedy is the cutting away the edge of the shoe.

PAWING.

Some hot and irritable horses are restless even in the stable, and paw frequently and violently. Their litter is destroyed, the floor of the stable broken up, the shoes

worn out, the feet bruised, and the legs sometimes sprained. If this habit does not exist to any great extent, yet the stable never looks well. Shackles are the only remedy, with a chain sufficiently long to enable the horse to shift his posture, or move in his stall; but these must be taken off at night, otherwise the animal will seldom lie down. Except, however, the horse possesses peculiar value, it will be better to dispose of him at once, than to submit to the danger and inconvenience that he may occasion.

QUIDDING.

A horse will sometimes partly chew his hay, and suffer it to drop from his mouth. If this does not proceed from irregular teeth, which it will be the business of the veterinary surgeon to rasp down, it will be found to be connected with sore-throat, and then the horse will exhibit some other symptom of indisposition, and particularly the swallowing of water will be accompanied by a peculiar gulping effort. In this case, the disease (catarrh, with sore throat,) must be attacked, and the quidding will cease.

ROLLING.

This is a very pleasant and perfectly safe amusement for a horse at grass, but cannot be indulged in the stable without the chance of his being dangerously entangled with the collar rein, and being cast. Yet, although the horse is cast, and bruised, and half-strangled, he will roll again on the following night, and continue to do so as long as he lives. The only remedy is not a very pleasant one to the horse, nor always quite safe; yet it must be had recourse to, if the habit of rolling is inveterate. "The horse," says Mr. Castley, "should be tied with length enough of collar to lie down, but not to allow of his head resting on the ground; because, in order to roll over, a horse is obliged to place his head quite down upon the ground."

SHYING

While this vice is often the result of cowardice, or playfulness, or want of work, it is at other times the consequence of a defect of sight. It has been remarked, and we believe very truly, that shying is oftener a vice of half or quarter-bred horses, than of those who have in them more of the genuine racing blood.

In the treatment of shying, it is of great importance to distinguish between that which is the consequence of defective sight, and what results from fear, or newness of objects, or mere affectation of skittishness. For the first, every allowance must be made, and care must be taken that the fear of correction is not associated with the imagined existence of some terrifying object. The severe use of the whip and the spur cannot do good here, and are likely to aggravate the vice tenfold. A word half encouraging and half scolding, with a gentle pressure of the heel, or a slight touch of the spur, will tell the horse that there was nothing to fear, and will give him confidence in his rider on a future occasion. It should be remembered, however, that although a horse that shies from defective sight may be taught considerable reliance on his rider, he can never have the cause of the habit removed. We may artificially strengthen the human sight, but that of the horse must be left to itself.

The shying from skittishness or affectation is quite a different affair, and must be conquered: but how? Severity is altogether out of place. If he is forced into contact with the object by dint of correction, the dread of punishment will afterwards be associated with that object, and, on the next occasion, his startings will be more frequent and more dangerous. The way to cure him is to go on, turning as little as possible out of the road, giving a harsh word or two, and a gentle touch with the spur, and then taking no more notice of the matter. After a few times, whatever may have been

the object which he chose to select as the pretended cause of affright, he will pass it almost without notice.

Shying on coming out of the stable is a habit that can rarely or never be cured. It proceeds from the remembrance of some ill-usage or hurt which the animal has received in the act of proceeding from the stable, such as striking his head against a low doorway, or entangling the harness. Coercion will but associate greater fear and more determined resistance with the old recollection. Mr. Castley gives an interesting anecdote, which tends to prove that while severity will be worse than useless, even kind treatment will not always break a confirmed habit. "I remember a very fine grey mare that had got into this habit, and never could be persuaded to go through a doorway without taking an immense jump. To avoid this, the servants used to back her in and out the stable; but the mare happening to meet with a severe injury of the spine, was no longer able to back; and then I have seen the poor creature, when brought to the door, endeavoring to balance herself, with a staggering motion, upon her half-paralysed hind extremities, as if making preparation and summoning up resolution for some great effort; and then, when urged, she would plunge headlong forward with such violence of exertion, as often to lose her feet, and tumble down, altogether most pitiable to be seen. This I merely mention," he continues, "as one proof how inveterate the habits of horses are. They are evils, let it always be remembered, more easy to prevent than to cure."

When the cure, however, is early attempted, it may be so far overcome that it will be unattended with danger or difficulty. The horse should be bridled when led out or in. He should be held short and tight by the head that he may feel he has not liberty to make a leap, and this of itself is often sufficient to restrain him. Punishment, or a threat of punishment, will be highly improper. It is only timid or high-spirited horses that acquire this habit, and rough usage invariably increases their agitation and terror. Some may be led out quite at

leisure when blindfolded; others when they have the harness bridle on; some will best take their own way, and a few may be ridden through the doorway that cannot be led. By quietness and kindness, however, the horse will be most easily and quickly subdued.

SLIPPING THE COLLAR.

This is a trick at which many horses are so clever that scarcely a night passes without their getting loose. It is a very serious habit, for it enables the horse sometimes to gorge himself with food, to the imminent danger of staggers; or it exposes him, as he wanders about, to be kicked and injured by other horses, while his restlessness will often keep the whole team awake. If the web of the halter, being first accurately fitted to his neck, is suffered to slip only one way, or a strap is attached to the halter and buckled round the neck, but not sufficiently tight to be of serious inconvenience, the power of slipping the collar will be taken away.

TRIPPING.

He must be a skilful practitioner or a mere pretender who promises to remedy this habit. It arises from a heavy forehand, and the fore legs being too much under horse, no one can alter the natural frame of the animal: if it proceeds from tenderness of the foot, grogginess, or old lameness, these ailments are seldom cured. Also, if it is to be traced to habitual carelessness and idleness, no whipping will rouse the drone. A known stumbler should never be ridden, or driven by any one who values his safety or his life. A tight hand or a strong-bearing rein are precautions that should not be neglected, although they are generally of little avail; for the inveterate stumbler rarely is able to save himself, and the tight rein may sooner and further precipitate the rider. If, after a trip, the horse suddenly starts forward, and endeavors to break into a sharp trot or canter,

the rider or driver may be assured that others before him have fruitlessly endeavored to remedy the nuisance.

If the stumbler has the foot kept as short and the toe pared as close as safety will permit, and the shoe is rounded at the toe, or has that shape given to it which it naturally acquires in a fortnight from the peculiar action of such a horse, the animal may not stumble quite so much.

WEAVING.

This consists in a motion of the head, neck, and body, from side to side, like the shuttle of a weaver passing through the web, and hence the name which is given to this peculiar and incessant and unpleasant action. It indicates an impatient, irritable temper, and a dislike to the confinement of the stable. A horse that is thus incessantly on the fret will seldom carry flesh, or be safe to ride or drive. There is no cure for it, but the close tying-up of the animal, or at least allowing him but one loose rein, except at feeding-time.

ON SOUNDNESS,

AND THE

PURCHASE AND SALE OF HORSES

That horse is sound in whom there is no disease, and no alteration of structure that impairs, or is likely to impair his natural usefulness. The horse is unsound that labors under disease, or has some alteration of structure which does interfere, or is likely to interfere with his natural usefulness.

CORNS

Manifestly constitute unsoundness. The portion of the foot in which bad corns are situated will not bear the ordinary pressure of the shoe; and accidental additional pressure from the growing down of the horn, or the introduction of dirt or gravel, will cause serious lameness. They render it necessary to wear a thick and heavy shoe, or a bar shoe, in order to protect the weakened and diseased part; and they are very seldom radically cured. There may be, however, and frequently is, a

difference of opinion as to the actual existence or character of the corn. A veterinary surgeon may consider it so slight and insignificant as not apparently to injure the horse, and he pronounces the animal to be sound; but he should be cautious, for there are corns of every shade and degree, from the slightest degree to the most serious evil. They may be so slight and manageable as, though ranging under the class of morbid alteration of structure, yet not to diminish the natural usefulness of the horse in any degree. Slight corns will disappear on the horse being shod with ordinary skill and care, even without any alteration in the shoe.

COUGH.

This is a disease, and consequently unsoundness. However slight may be its degree, and of whatever short standing it may be, although it may sometimes scarcely seem to interfere with the usefulness of the horse, yet a change of stabling, or slight exposure to wet and cold, or the least over-exertion, may, at other times, cause it to degenerate into many dangerous complaints. A horse, therefore, should never be purchased with a cough upon him, without a special warranty; or if—the cough not being observed—he is purchased under a general warranty, that warranty is thereby broken. It is not law, that a horse may be returned on breach of the warranty. The seller is not bound to take him back, unless he has contracted so to do; but he is liable in damages.

ROARING, WHEEZING, WHISTLING, HIGH-BLOWING, AND GRUNTING.

Being the result of alterarion of structure, or disease in some of the air-passages, and interfering with the perfect freedom of breathing, especially when the horse is put on his speed, without doubt constitute unsoundness. There are decisions to the contrary, which are now universally admitted to be erroneous.

Broken-wind is still more decidedly unsoundness.

CRIB-BITING

Although some learned judges have asserted that crib-biting is simply a trick or bad habit, it must be regarded as unsoundness. This unnatural sucking in of the air must to a certain degree injure digestion. It must dispose to colic, and so interfere with the strength, and usefulness, and health of the horse. Some crib-biters are good goers, but they probably would have possessed more endurance had they not acquired this habit; and it is a fact well established, that, as soon as a horse becomes a crib-biter, he, in nine cases out of ten, loses condition.

CURB

Constitutes unsoundness while it lasts, and perhaps while the swelling remains, although the inflammation may have subsided; for a horse that has once thrown out a curb is, for a while at least, very liable do so again, to get lame in the same place on the slightest extra exertion; or, at all events, he would there first fail on extraordinary exertion. A horse, however, is not returnable, although he should spring a curb five minutes after the purchase; for it is done in a moment, and does not necessarily indicate any previous unsoundness or weakness of the part.

CUTTING,

As rendering a horse liable to serious injury of the legs, and indicating that he is either weak, or has an awkwardness of gait inconsistent with safety, produces, rather than is, unsoundness. Many horses go lame for a considerable period after cutting themselves severely; and others have dropped from the sudden agony and endangered themselves and their riders.

ENLARGED GLANDS.

Simple catarrh will occasionally, and severe affection

of the chest will generally be accompanied by swelling of these glands, which does not subside for a considerable time after the cold or fever has apparently been cured. To slight enlargements of the glands under the jaw much attention need not be paid; but if they are of considerable size, and especially if they are tender, and the glands at the root of the ear partake of the enlargement, and the membrane of the nose is redder than it should be, we should hesitate in pronouncing that horse to be sound. We must consider the swelling as a symptom of disease.

ENLARGED HOCK.

A horse with enlarged hock is unsound, the structure of this complicated joint being so materially affected that, although the horse may appear for a considerable time to be capable of ordinary work, he will occasionally fail even in that, and a few days' hard work will always lame him.

THE EYES.

That inflammation of the eye of the horse which usually terminates in blindness of one or both eyes, has the peculiar character of receding or disappearing for a time, once or twice, or thrice, before it fully runs its course. The eye, after an attack of inflammation, regains so nearly its former natural brilliancy, that a person even well acquainted with horses will not always recognise the traces of former disease. After a time, however, the inflammation returns, and the result is inevitable. A horse that has had one attack of this complaint, is long afterwards unsound, however perfect the eye may seem to be, because he carries about with him a disease that will probably again break out, and eventually destroy the sight. Whether, therefore, he may be rejected or not, depends on the possibility of proving an attack of inflammation of the eye, prior to the

purchase. Next to direct evidence of this are appearances about the eye, of which the veterinary surgeon at least ought not to be ignorant. They consist chiefly of a puckering of the lids towards the inner corner of one or both eyes—a difference in the size of the eyes, although perhaps only a slight one, and not discovered except it be looked for—a gloominess of the eye—a dulness of the iris—a little dulness of the transparent part of the eye generally—a minute, faint, dusky spot, deep in the eye, and generally with little radiations of white lines proceeding from it. If these symptoms, or the majority of them, existed at the time of purchase, the animal had assuredly been diseased before, and was unsound. Starting has been considered as an equivocal proof. It is usually an indication of defective sight, but it is occasionally a trick. Connected, however, with the appearances just described, it is a very strong corroborative proof.

LAMENESS,

From whatever cause arising, is unsoundness. However temporary it may be, or however obscure, there must be disease which lessens the utility of the horse, and renders him unsound for the time.

OSSIFICATION OF THE LATERAL CARTILAGES,

Constitutes unsoundness, as interfering with the natural expansion of the foot, and, in horses of quick work, almost invariably producing lameness.

PUMICED-FOOT.

When the union between the horny and sensible laminæ, or little plates of the foot is weakened, and the coffin-bone is let down, and presses upon the sole, and the sole yields to this unnatural weight, and becomes rounded, and is brought in contact with the ground, and is bruised and injured, that horse must be unsound, and

unsound for ever, because there are no means by which we can raise the coffin-bone again into its place.

QUIDDING.

If the mastication of the food gives pain to the animal, in consequence of soreness of the mouth or throat, he will drop it before it is perfectly chewed. This, as an indication of disease, constitutes unsoundness. Quidding sometimes arises from irregularity in the teeth, which wounds the cheek with their sharp edges; or a protruding tooth renders it impossible for the horse to close his jaws so as to chew his food thoroughly. Quidding is unsoundness for the time; but the unsoundness will cease when the teeth are properly filed, or the soreness or other cause of this imperfect chewing removed.

QUITTOR

Is manifestly unsoundness.

RING-BONE.

Although when the bony tumor is small, and on one side only, there is little or no lameness—and there are a few instances in which a horse with ring-bone has worked for many years without its return—yet from the action of the foot, and the stress upon the part, the inflammation and the formation of bone may acquire a tendency to spread so rapidly, that we must pronounce the slightest enlargement of the pasterns, or around the coronet, to be a cause of unsoundness.

SANDCRACK

Is manifestly unsoundness. It may, however, occur without the slightest warning, and no horse can be rejected on account of a sandcrack that has sprung after purchase. Its usual cause is too great brittleness of the

crust of the hoof; but there is no infallible method of detecting this, or the degree in which it must exist in order to constitute unsoundness. When the horn around the bottom of the foot has chipped off so much that only a skilful smith can fasten the shoe without pricking the horse, or even when there is a tendency in the horn to chip and break in a much less degree than this, the horse is unsound, for this brittleness of the crust is a disease of the part, or it is such an altered structure of it as to interfere materially with the usefulness of the animal.

BOG OR BLOOD-SPAVIN

Is unsoundness, because, although it may not be productive of lameness at slow work, the rapid and powerful action of the hock in quicker motion will produce permanent, yet perhaps not considerable lameness, which can scarcely ever be with certainty removed.

SPLINT.

It depends entirely on the situation of the bony tumor or the shank-bone, whether it is to be considered as unsoundness. If it is not in the neighborhood of any joint, so as to interfere with its action, and if it does not press upon any ligament or tendon, it may be no cause of unsoundness, although it is often very unsightly. In many cases it may not lessen the capability and value of the animal.

THICKENING OF THE BACK SINEWS.

If the flexor tendons have been sprained, so as to produce considerable thickening of the cellular substance in which their sheaths are enveloped, they will long afterwards, or perhaps always be liable to sprain, from causes by which they would otherwise be scarcely affected. The continuance of any considerable thickness around

the sheaths of the tendons indicates previous and violent sprain. This very thickening will fetter the action of the tendons, and, after much quick work, will occasionally renew the inflammation and the lameness; therefore, such a horse cannot be sound.

In the purchase of a horse the buyer usually receives, embodied in the receipt, what is termed a WARRANTY. It should be thus expressed:

"Received of A. B. two hundred dollars for a grey mare, warranted only five years old, sound, free from vice, and quiet to ride and drive.

"$200. "C. D."

DIRECTIONS FOR RAISING

CATTLE, SHEEP, AND SWINE.

DISEASES OF HORNED CATTLE.

INFLAMMATION.

Inflammation is the most frequent diseased condition to which neat cattle are subject.

External inflammation is known by the part being *swollen*, *tender*, and *hotter* than in its natural state. In garget or downfall of the udder, which is an inflammation of one or more quarters of the bag, the affected parts are swollen, tender, and hot.

In black-leg, a disease frequent in young cattle, the affected part loses its sensibility, and becomes dark-colored, and is said to be *mortified*. It is then speedily separated, or ought to be separated from the living portions around. Mortification is usually the result of *violent* inflammation, by which the texture of the part is speedily broken down, and its vitality destroyed.

When the inflammation runs high, or continues long, it affects the whole system, and brings on fever.

The *swelling* of the inflamed part is principally to be ascribed to the increased quantity of blood passing through it.

Internal Inflammation can be ascertained only by the effect which it produces on the system. There is no inflammation of any important internal part that is not quickly accompanied by fever; and that fever and the

degree of it are easily ascertained, by the heat of the breath and the mouth, and the base of the horn, by the redness of the eye, and the frequency and hardness of the pulse, the loss of appetite, and, often, the cessation of rumination.

The symptoms of internal inflammation will be related as the inflammation of each part comes before us.

When it seizes any important organ, as the *brain*, *lungs*, *bowels*, *kidneys*, *eyes*, *udder*, or *womb*, bleeding is to be immediately had recourse to; and, after bleeding, a purging drink is to be administered: sometimes it is necessary to insert a seton in the dew-lap.

In external inflammation from severe bruises, wounds, and other accidents, fomentation with warm water, poultices made of linseed meal—when they can be applied—and purging drink give much relief. If external inflammation is considerable, it will always be necessary to bleed the beast.

BLEEDING MAY TAKE PLACE.

1. Where animals in a thriving state rub themselves until the hair comes off, and the spot is covered with a dry scab; while at the same time the eyes appear dull, languid, red, or inflamed, the breath hot, and the veins puffed up, and considerably larger than usual.

2. In all kinds of inflammatory diseases, as of the brain, lungs, kidneys, bowels, eyes, womb, bladder, and udder, or in swelling of the joints.

3. In the disease called blain, and in which bleeding, not only general but local, and local far more than general, has the best possible effect, the tumefaction usually almost immediately subsiding, and the beast speedily recovering.

4. When the glands or kernels between the jaws, or those of the throat, are enlarged, and especially if they are only recently affected, immediate recourse should be had to bleeding, for otherwise the lungs will probably become diseased, and dangerous or consumptive hoose will speedily ensue.

5. In bruises, hurts, wounds upon the head, strains in different parts, and all other accidents that may occur to the animal, and in which there is reason to apprehend considerable inflammation, bleeding will be proper.

6. In violent catarrh or cold, bleeding is employed; but in slight cases, a few fever drinks will restore the animal.

7. The yellows, when attended with feverish symptoms, or constipation of the bowels, require bleeding.

The *Fleam* is an instrument in general use for oxen, and the jugular or neck vein is that which is mostly opened. Local bleeding is, however, in many cases particularly serviceable. In inflammation of the eye, the eye-vein is frequently cut; in foot-halt, we sometimes bleed at the toe; and in inflammation of the bowels, or the udder, or even of the chest, blood is advantageously taken from the milk-vein.

The quantity of blood that it may be proper to take away at one time, must be regulated by the size, strength, and condition of the animal, and the disease under which he labors. In many inflammatory complaints too much can hardly be taken, provided the bleeding is stopped as soon as the patient appears likely to faint, or to fall down. A strong healthy beast will bear the loss of five or six quarts of blood, without the least injury. Larger cattle that are attacked with inflammatory complaints, will profit by the abstraction of a greater quantity; seven or eight quarts may be taken away with decided advantage: but when it is necessary to repeat the bleeding, the degree of fever and the strength of the beast will regulate the quantity. The blood should flow from a large orifice, for sudden depletion is far more powerful in its operation than when the blood is suffered slowly to trickle down. The blood must *never be suffered to fall upon the ground, but should be received into a measure*, in order that the quantity taken may be known. No absolute quantity of blood should ever be prescribed, but when extensive bleeding is demanded, the stream should flow until the

pulse falters, or intermits, or the animal begins to heave violently, or threatens to fall. The beast should not be permitted to drink cold water immediately after bleeding, nor to graze in the field: the former has sometimes induced troublesome catarrh, and the latter may cause the orifice to open again. If this operation is performed in the summer season, it will be most prudent to fetch the cattle out of the pasture towards evening, in order that they may be bled; and, after that, to let them stand in the fold-yard all night, and drive them back to the field on the following morning.

PHYSIC.

The chief purgatives in use for neat cattle are Glauber's salts, Epsom salts, Barbadoes aloes, Linseed oil, and Sulphur. In obstinate constipation of the bowels, ten or fifteen grains of the farina of the Croton nut, freshly prepared, may be added with good effect. One pound of Glauber's, or Epsom salts, will purge a full-sized beast. Where there is considerable fever, or the attack of fever is apprehended, there is no purgative so beneficial as the Epsom salts. In bad cases, twenty-four ounces may be given at a dose, and eight ounces of sulphur every six hours afterwards, until the full purgative effect is produced. Linseed oil is rapidly superseding the more expensive and the more uncertain castor oil: dose is from a pint to a pint and a half. As a mild aperient, and in cases where there is no great degree of fever, and a violent purge is not required, there are few better things than Sulpur. Where nothing else is at hand, and the case is urgent, Common Salt is no contemptible medicine: a pound of it dissolved in water will produce a very fair purgative effect, but it should not be given if the animal labors under fever. The following are the cases in which purgative medicines are found useful:

1. A purging drink is very properly given to cows soon after calving, in order to prevent the milk fever.

2. Milch cows in particular, if feeding on herbage, or

other food agreeable to their palate, will often continue to graze until they are in danger of suffocation. Thus the powers of digestion become over-burdened, and the animal appears dull and heavy, and feverish symptoms are induced. Purgatives will give the most effectual relief in these cases, and if the appetite does not return soon after the physic, a cordial ball will be useful in restoring it.

3. Cows that are turned into fresh pastures sometimes become bound in their body, in which case a purging drink must be immediately administered, and repeated every twelve hours, until the desired effect is obtained: a clyster should be given, if the first drink does not operate. If the costiveness is accompanied with pain and feverish symptoms, inflammation of the bowels is to be suspected, and must be treated accordingly.

4. When red-water is recent, a purging drink or two will often completely remove it.

5. In the yellows it is generally necessary to give a purging drink, and, after that, cordial tonic drinks, in order to invigorate the digestive organs.

6. When medicines are given to prevent cows from slipping their calves, they are generally preceded by physic.

7. In all inflammatory complaints, a purging drink should be administered after the bleeding.

8. If external inflammation, occasioned by wounds, bruises, and other causes, runs high, and affects the whole system, purgative medicines are absolutely necessary.

SETONING.

In some districts the hoose in calves is very prevalent and fatal: where this is the case, they should all be setoned when they are getting into condition, and before they are attacked by the disease.

In joint evil, I have frequently inserted a seton in the dew-lap with decided good effect.

Mode of inserting a Seton.—The seton is commonly

made of tow and horse hair plaited together, or cord or coarse tape alone, or leather. It should be tolerably thick, and eight, ten, or twelve inches in length. Before inserting the seton, it should be dipped in oil of turpentine. The seton being now prepared, an assistant is to hold the animal, while the seton-needle, with the cord affixed to it, is plunged into the upper edge of the brisket or dew-lap, and brought out again towards its lower edge: the space between the two openings should be from four to eight inches. The seton is to be secured by fastening a small piece of wood, or tying a large knot at either end of the cord. Matter will begin to run the second day, and after that, the cord should be drawn backwards and forwards two or three times every day, in order to irritate the parts, and by this means increase the discharge.

When setoning is had recourse to in inflammatory complaints, the cord should be dipped in the following blistering ointment:

Blistering Ointment.—Take yellow basilicon, one ounce; cantharides, in powder, three drachms; spirit of turpentine, two fluid drachms.

The root of the common dock forms a very good seton, and one that will act speedily and powerfully; but the best of all, where a considerable effect is intended to be produced, is the root of the black hellebore. This will very quickly cause considerable swelling as well as discharge.

COLD AND COUGH.—HOOSE.

A simple cold, attended by slight cough and discharge from the nostrils, is easily removed. Warm housing, a few mashes, and the following drink, will usually succeed:

RECIPE.

Cough and Fever Drink.—Take emetic tartar, one

drachm; powdered digitalis, half a drachm; and nitre, three drachms. Mix, and give in a quart of tolerably thick gruel.

Cough occasionally assumes an epidemic character—from sudden changes of the weather, chiefly and particularly in the spring and the fall of the year.

Symptoms of Epidemic Cold or Catarrh, or Influenza.—The beast is dull and heavy, with weeping at the eyes, and dry muzzle; the hair looks pen-feathered, or staring; the appetite fails; the secretion of milk is diminished; there is considerable heaving of the flanks; the pulse is from 50 to 70, and the bowels are generally costive or *sapped.*

It will be necessary to commence the treatment of this disease with bleeding. From four to six quarts of blood should be taken, and then a dose of physic administered. The following will be a good purgative medicine in such a case:

RECIPE.

Purging Drink.—Take epsom salts, one pound; powdered caraway-seeds, half an ounce. Dissolve in a quart of warm gruel, and give.

After that the drink No. 1 should be given morning and night, the drink No. 2 being repeated if the bowels should be costive.

It will be proper to house the beast, and especially at night; and a mash of scalded bran with a few oats in it, if there is no fever, should be allowed. It is necessary carefully to watch the animals that are laboring under this complaint; and, if the heaving should continue, or the muzzle again become or continue dry, and the breath hot, more blood should be taken away, and the purging drink repeated.

INFLAMMATION OF THE LUNGS.

When common catarrh has been neglected, it will

sometimes run on to inflammation of the lungs, or the beast may be attacked with this disease without any of the previous symptoms of catarrh. This is a very serious complaint, and requires the most prompt and decisive treatment.

The symptoms are dulness, shivering, and cough that is particularly sore; the ears, roots of the horns, and legs sometimes cold, but not invariably so, as the quantity of cellular membrane about the legs is often sufficient to keep them warm in spite of the nature of the complaint; the breath and mouth are hot; the mouth is generally open, and there is a ropy discharge from it; the beast will often lie down, and can scarcely be induced to move; the flanks heave very laboriously, and the head is protruded, showing the great difficulty of breathing. The pulse is not always much increased in number, but is oppressed, and can sometimes scarcely be felt.

Inflammation of the lungs is caused by the perspiration being obstructed from sudden and great changes of the weather, especially when accompanied with wet. Cattle that are driven long distances, and then exposed to the cold and damp of the night, are particularly liable to it.

Sometimes the membrane covering the lungs and lining the chest is the part principally attacked; the disease is then termed pleurisy, and is in this form often complicated with rheumatism, but is more usual for the substance of the lungs to be affected in common with their envelopments.

Copious bleeding is the remedy most to be depended on for subduing the inflammation, and should be had recourse to as soon as the disease is discovered. The beast should be put into a cool cow-house well littered, and immediately bled. If the difficulty of breathing and other symptoms are not much relieved in six or eight hours after the first bleeding, it should be repeated. A third or fourth bleeding may in bad cases be requisite. As a general rule, and especially in inflammation of the lungs, and at the first bleeding, the blood

should flow until the pulse begins to falter, and the animal seems inclined to faint. The faltering of the pulse will regulate the quantity of the after-bleedings. Little bleedings of two or three quarts, at the commencement of inflammation of the lungs, can never be of service; from six to eight quarts must be taken, or even more, regulated by the circumstances that have been mentioned, and the blood should flow in a large full stream.

A seton should be set in the dew-lap immediately after the first bleeding, and the purging drink (No. 2,) given. Four drachms of nitre, two of extract of belladonna, and one of tartarized antimony, may afterwards be administered twice a day in a drink.

In very severe cases the chest has been fired and blistered with advantage.

Warm water and mashes must be regularly given two or three times a day.

RHEUMATISM, OR JOINT-FELLON.

The early symptoms of this complaint are those of common catarrh, with no great cough, but more than usual fever: by degrees, however, the animal shows some stiffness in moving, and if the hand is pressed upon the chime or any part of the back, the beast will shrink, as if this gave him pain. When the complaint goes no farther than this, it is called *chine-fellon* in many parts of the country; but generally, in two or three days, the animal appears stiffer in the joints; these afterwards begin to swell, and are evidently painful, particularly when he attempts to move. Sometimes the stiffness extends all over the body, and to such a degree that the beast is unable to rise without assistance.

This is generally termed joint-fellon. Old cows are very subject to it, and especially a short time before calving.

The following purging drink should be given:

RECIPE.

Sulphur Purging Drink.—Take sulphur, eight

ounces; ginger, half an ounce. Mix with a quart of warm gruel. This drink should be repeated every third day if the bowels appear to require it.

The bowels having been gently opened, a drink which may cause some determination to the skin, and increase the insensible perspiration, should be administered.

RECIPE.

Rheumatic Drink.—Take nitre, two drachms; tartarized antimony, one drachm; spirit of nitrous ether, one ounce; aniseed powder, one ounce. Mix with a pint of very thick gruel, and repeat the dose morning and night, except when it is necessary to give the Sulphur Purging Drink.

If any of the joints should continue swelled and painful, they should be rubbed twice a day, and for a quarter of an hour each time, with a gently stimulating embrocation.

RECIPE.

Rheumatic Embrocation.—Take neat's foot oil, four ounces; and camphorated oil, spirit of turpentine, and laudanum, each one ounce; oil of origanum, one drachm. Mix.

INFLAMMATION OF THE LIVER.

When the milch cow is attacked, there is a diminution of the milk, and it has a ropy appearance and saltish taste after being separated from the cream. The animal has a heavy appearance, the eyes being dull, the countenance depressed, with a stiffened, staggering gait; the appetite is impaired, and the membrane of the nostrils and the skin is of a yellow color. Sometimes the respiration is much disturbed; at others, it appears tranquil; but the pulse, though unusually quickened, is rarely hard or full. The bowels are generally consti-

pated, though sometimes purging exists. Rumination is usually disturbed, and occasionally altogether suspended. To these will occasionally be added the characteristic symptoms of pain on pressure on the edge of the short ribs on the right side. In acute inflammation of the liver, the most frantic pain has been exhibited; but this is rarely the case.

Inflammation of the liver frequently leaves after it a great deal of weakness, and tonics are clearly indicated. The best medicine that can be given is the following:

RECIPE.

Tonic Drink.—Take gentian root, powdered, half an ounce; ginger, powdered, one drachm; epsom salts, two ounces. Mix the whole with a pint of warm gruel, and give it morning and night.

THE YELLOWS, OR JAUNDICE.

It may be produced by inflammation of the liver, or too great secretion of the bile, or stoppage of the vessels through which the bile should flow into the bowels. If its passage is obstructed, it is thrown back again upon the liver, and there taken up by the absorbents, and carried into the circulation, and communicates a yellow color to the blood.

At the beginning of the disease there is considerable dulness and languor, and loss of appetite. The cow wanders about by herself, or is seen standing by the side of the hedge or the fence in a most dejected manner. The quantity of milk is generally lessened; the bowels are costive; and the fore-teeth are sometimes loose.

Should the pulse be strong as well as quick, moderate bleeding will be judicious, but not otherwise. The bowels should then be freely opened by means of a purging drink, and kept open by half-doses of it administered as occasion may require.

While the tonic drink is given in the morning, the following may be given at night:

RECIPE.

Drink for the Yellows.—Take of calomel and opium, a scruple each. Mix and suspend in a little thick gruel.

INFLAMMATION OF THE BRAIN.

In the early period of it the beast is dull and stupid. He stands with his head protruded, or pressed against something for support. He refuses to eat, ceases to ruminate, and is, in a manner, unconscious of surrounding objects. Now and then he will stand motionless for a long time, and then suddenly drop; he will start up immediately, gaze around him with an expression of wildness and fear, and then sink again into his former lethargy. All at once, however, his eyes will become red, and seemingly starting from their sockets; the countenance will be both anxious and wild; the animal will stagger about, falling and rising, and running unconsciously against everything in his way: at other times he will be conscious enough of things around him, and possessed with an irrepressible desire to do mischief. He will stamp with his feet, tear up the ground with his horns, run at every one within his reach, and with tenfold fury at any red object; bellowing all the while most tremendously, and this he will continue until nature is quite exhausted: a sudden and violent trembling will then come over him, he will grind his teeth, and the saliva will pour from his mouth; he will fall, every limb will be convulsed, and he will presently die.

Causes.—It proceeds most commonly from a redundancy of blood in the system, called by farmers an overflowing of the blood; and this is induced by cattle thriving too fast when turned on rich pasture-grounds, or their being fed too quickly in order to get them into condition for show or sale. It is sometimes occasioned by the intense heat of the sun, when cattle have been

turned into the fields where there has been nothing to shade them from its influence. It may be brought on by severe contusions on the head, or by the cattle being harassed and frightened, when driven along the road or through large towns.

The chief or the only cure is bleeding. The neck vein should be opened on each side, if possible, and the blood should be suffered to flow until the animal drops. As much should be taken as can be got, or at least, the blood should flow until the violence of the symptoms is quite abated.

To this a dose of physic should follow.

RECIPE.

A Strong Physic Drink.—Take epsom or Glauber's salts, half a pound; the kernel of the croton nut, ten grains: take off the shell of the croton nut, and weigh the proper quantity of the kernel. Rub it down to a fine powder; gradually mix it with half a pint of thick gruel, and give it, and immediately afterwards give the salts, dissolved in a pint and a half of thinner gruel.

If the violence or even the wandering should remain, another bleeding should take place six hours afterwards, and this also until the pulse falters; and the purging should be kept up by half-doses of the purging drink above.

STAGGERS, OR SWIMMING IN THE HEAD.

The symptoms are heaviness and dulness; a constant disposition to sleep, which is manifested by the beast resting its head upon any convenient place; and he reels or staggers when he attempts to walk.

The cure must be attempted by taking four, five, or six quarts of blood from the animal, according to its size and strength; the purging drink must then be administered, and (No. 2) continued in half-doses every eight hours, until the full purgative effect is produced. If the animal is not relieved in the course of two hours

from the first bleeding, the operation must be repeated the same extent, unless the beast should become faint; and the bowels must be kept in a loose or rather purging state by No. 2. As soon as the bowels are opened, the fever drink (No. 1,) should be given morning, noon, and night, until the patient is well.

INFLAMMATION OF THE BOWELS, WITH COSTIVENESS.

Inflammation of the bowels is by no means an uncommon disease among neat cattle, and frequently proves fatal to them from injudicious treatment. It is a complaint easily recognisable on account of the peculiar symptoms by which it is attended.

The animal is continually lying down and getting up again immediately, and, when up, he strikes at his belly with the hind feet. The bowels are obstinately constipated: the offal, if any is voided, is in small quantities—hard, covered with mucus, and that sometimes streaked with blood—and the urine is generally voided with difficulty. The pulse is quicker than natural, and there is much heaving at the flanks.

It is distinguished from colic by the great degree of fever that evidently attends it, the muzzle being dry and the mouth hot. The animal becomes speedily weak, he falls or throws himself down suddenly, and when he rises he does it with difficulty, and he staggers as he walks.

The disease mostly arises from sudden exposure to cold; and especially when cattle go into rivers or ponds after being heated and fatigued.

The first thing to be done, and that which admits of no delay, is to bleed; from six to eight quarts of blood at least should be taken away. Immediately afterwards the purging drink should be administered, and its effect promoted by half-doses of No. 2, given every six hours. If one day is suffered to pass without proper means being taken, the beast is irrecoverably lost.

If purging should not be accomplished after the third dose of the medicine, a pound of common salt may be

given. Should not this succeed, a pound and a half of castor-oil must be administered.

Clysters, numerous, and great in quantity, must be administered. The Epsom salts and the castor-oil will not do harm in whatever quantities they are given: it will not be prudent, however, to repeat the common salt.

DIARRHŒA, OR PURGING.

Purging is produced by change of food, from dry to green meat, or from short to luxuriant pasture; by poisonous plants, bad water, or unknown atmospheric agency.

The farmer will not regard an occasional fit of purging; he will only attack it if it is violent, or if it continues too long, by giving a mild dose of physic, in order to assist nature in her effort to get rid of some of the evil.

From half to three-quarters of a pound of Epsom salts should be given with the usual quantity of ginger. The next day he may probably administer a little astringent medicine. The following will be effectual, and not too powerful:

RECIPE.

Astringent Drink.—Take prepared chalk, two ounces; oak bark, powdered, one ounce; catechu, powdered, half an ounce; opium, powdered, two scruples; ginger, powdered, two drachms. Mix and give it in a quart of warm gruel.

DYSENTERY, SLIMY FLUX, OR SCOURING ROT.

It begins with frequent and painful efforts to expel the offal, which is thin, slimy, stinking, and olive-colored. The animal, as appears from his restless state, suffers much pain, frequently lying down and soon rising again. There is also a frequent rumbling noise in the intestines. At length, he evidently begins to get

weak, rumination is imperfectly performed, and the food passes from him half digested.

As the disease proceeds, the dew lap hangs down and has a flabby appearance; the offal runs off with a putrid and offensive smell, and, as it falls upon the ground, rises up in bubbles, and a membranous or skinny-like substance is often seen upon it. The hair all over the body soon appears pen-feathered or staring. Feverish symptoms also accompany the complaint: the eyes become dull and inflamed, there is much working of the flanks, and the pulse is thick.

Causes.—Taking cold at the time of calving; long journeys; exposure to sudden vicissitudes of the weather; and, after being over-heated in traveling, being turned into damp pastures, &c.

In all cases the animals should be taken from grass, and put into a large cow-house, or an open yard, where they can be sheltered from the weather, and kept on dry food, such as good hay, ground oats, barley, and beans. An equal proportion of each of the three last articles and of linseed cake will make an excellent food for cattle laboring under dysentery. A quantity proportionate to the appetite of the patients should be given two or three times a day, or if they are much reduced and their appetite is quite gone, a thick gruel should be made of these ingredients, and administered three or four times a day.

Remedy.—Bleeding, proportioned to the suddenness and violence of the attack, and the apparent degree of fever, should be first resorted to.

If the eyes are inflamed, with heaving of the flanks, and painful twitchings of the belly, accompanied by severe straining and apparent gripings in the expulsion of the excrement, the abstraction of blood is indispensable.

The purgative drink (No. 2.) should precede the use of every other medicine, in whatever state the bowels may be. It will prepare for the safer use of astringents. In almost every case there will be something in the

bowels, which, if it did not cause the disease, contributes to keep it up.

The following drink may be given, and continued morning and night for five or six days:

RECIPE.

Astringent Drink with Mutton Suet.—Take mutton suet, one pound; new milk, two quarts; boil them together until the suet is dissolved; then add opium, powdered, half a drachm; ginger, one drachm, having previously well mixed them with a spoonful or two of fluid.

When the dysentery is stopped, the beast should very slowly and cautiously be permitted to return to his former green food.

In those cases, and they are much too numerous, which totally resist the influence of the medicines already recommended, other means should be tried. The alum whey has sometimes succeeded, and is thus prepared:

RECIPE.

Alum Whey.—Take alum, half an ounce; milk, two quarts. Boil them together for ten minutes, and strain.

This may be administered twice every day.

RED-WATER.

The disease consists of a discharge of high-colored urine.

There are evidently two distinct species of red-water. One, but which occurs most seldom, begins with decided symptoms of fever. There is shivering, succeeded by increased heat of the body; the muzzle dry; working of the flanks; urine of a red color, evidently tinged with blood, and occasionally consisting almost entirely of blood, discharged in small quantities, and frequently

with considerable pain; loss of appetite. As the disease proceeds. the animal loses strength; the bowels become constipated or very loose; and the urine of a dark color, approaching to black.

The discharge of bloody urine may either proceed from inflammation of the kidneys or a rupture of some of the blood-vessels, and in either case blood is discharged with the urine, and may be often detected in clots; whilst in the other kind of red-water, although the urine is dark in color, it does not contain blood. The former disease is more frequent with bulls and oxen, and the latter with milch cows.

In some cases where blood is discharged with the urine without any inflammatory appearance, the exhibition of astringents and stimulants, such as the following, have effected a cure:

RECIPE.

Take oil of juniper, two to four drachms; tincture of opium, one ounce; oil of turpentine, one ounce. Mix, and give in a pint of linseed oil, once or twice a day.

GARGET, OR THE DOWNFALL IN THE UDDER OF COWS.

This disorder makes its appearance in one or more quarters of the udder, which become swollen, hard, hotter than usual, and painful when pressed. If the patient is a milch-cow, the secretion of milk is lessened, and mingled with blood, pus, and corruption.

It is inflammation, and is most commonly induced by the animal catching cold.

It will be necessary, as soon as the downfall is discovered, to bring the animal out of the pasture, and take away from three to five quarts of blood, according to her size or strength. If she is bled at night, it will be proper on the next morning to give her the purging drink No. 2.

The cow should be sparingly fed for a day or two on

mashes, with a little hay, and afterwards turned on rather short pasture.

The following ointment should be well rubbed into the affected quarter, immediately after milking, but it must be carefully washed off again with warm water before the milk is drawn.

RECIPE.

Mercurial Garget Ointment.—Take soft soap, one pound; mercurial ointment, two ounces; camphor, rubbed down with a little spirit of wine, one ounce: rub them well together.

In obstinate cases the iodine has been applied to the indurated udder with great success.

RECIPE.

Iodine Ointment.—Take hydriodate of potash, one drachm; lard, seven drachms: rub them well together.

A portion, varying from the size of a nut to that of a filbert, according to the extent and degree of the swelling and hardness, should be well rubbed into the affected part morning and night.

The bowels must be kept open with half-doses of No. 2. The fever drink, No. 1, will also be useful, or one more decidedly diuretic, as the following

RECIPE.

Diuretic Drink.—Take powdered nitre, one ounce; powdered rosin, two ounces; ginger, two drachms: mix them well together in a little treacle, and give them in warm gruel.

In extreme cases, slight incisions with a lancet, where matter cannot be detected, will often be serviceable. The flow of blood should be encouraged by fomentations with warm water. The teats are sometimes cut off in

obstinate cases of this kind ; but that should, if possible, be avoided, for the quarter will be lost, and there will be a serious diminution in the quantity of milk as long as the cow lives. The teat may be cut deeply in order to let out the matter. This wound will readily heal again, and the quarter will be as useful as ever.

The *Sore Teats* to which some cows are subject is a very different disease, and often a very troublesome one. .

The following ointment will generally be found effectual :

RECIPE.

Ointment for Sore Teats.—Take elder ointment, six ounces ; bee's wax, two ounces. Mix them together, and add an ounce each of sugar of lead and alum, in fine powder,—stir them well together until cold.

A little of this should be rubbed on the teats morning and night after milking.

TREATMENT OF THE COW BEFORE AND DURING CALVING.

The cow should be dried six or eight weeks before calving.

During the early period of gestation the animal may, and should be tolerably well fed, for she has to provide milk for the dairy and nourishment for the fœtus ; yet even here there should be moderation and care : but when she is dried, her food should be considerably diminished.

Some cows are apt to slink their calves, or to produce them dead before their time. This generally happens about the middle of their pregnancy. If about that time a cow is uneasy, feverish, off her food, or wandering about in search of something for which she seems to have a longing, or most greedily and ravenously devouring some particular kind of food, she should be bled

and physicked (No 2). If she is not quieted, she should be bled and physicked again in the course of three or four days. She should be immediately removed from the other cows; for should she slink her calf among them, it is not improbable that some, or even all, of the others will do the same.

When it appears that labor is close at hand, she should be driven gently to the cow-house, and for a while left quite alone.

THE MILK FEVER, OR THE DROP.

Whenever it takes place, at home or in the field, it is distressing to the animal, as well as troublesome to the owner; for the beast is seldom able to rise during several days.

It most commonly appears about the second or third day after calving; but the cow is occasionally down within a few hours after parturition. It is first recognized by the animal refusing her food, looking dull and heavy; then follows protrusion of the eye, heaving of the flanks, restlessness, and every symptom of fever. In a few hours, or on the next day at the latest, the cow begins to stagger; is weak in the loins; palsy steals over the whole frame; and she falls, unable to rise again. From this seeming palsy of the hinder limbs, and sometimes of the whole frame, the disease is very appropriately called *dropping after calving*.

The principal expectation of relief, however, must be placed on the use of powerful purgatives.

RECIPE.

Take Epsom or Glauber's salts, twelve ounces; flour of sulphur, four ounces; powdered ginger, four drachms; spirit of nitrous ether, one ounce. To be dissolved in warm water.

One-half of this draught may be repeated twice a day until the bowels are properly opened. In the severer

affection it will be proper to add from te[illegible] twenty drops of the croton oil to the first draught, and even two drachms of carbonate of ammonia and ten grains of cantharides have been conjoined with advantage. It is of importance to administer the draught slowly and carefully; and when the cow is any way unconscious, it will be better to give it by means of Read's syringe, putting the tube half-way down the neck, so as to prevent any of the medicine getting into the windpipe, where it has been known to produce fatal inflammation.

It will be a very bad symptom if she begins to swell, and there are frequent belchings of very fœtid gas.

The following ball should then be given, still continuing the purgative medicine if necessary:

RECIPE.

Cordial Drink.—Take caraway powder, one ounce; gentian, powdered, half an ounce; ginger, powdered, half an ounce; essence of peppermint, twenty drops.

Half the quantity of the above ingredients should also be given morning and night as a drink, in a pint of warm ale, and the same quantity of thin gruel.

MURRAIN, OR PESTILENTIAL FEVER.

Symptoms.—The animal is found with its head extended, that its laborious breathing might be accomplished with less dread of suffocation; there is considerable difficulty in swallowing; enlargement of the glands under the ear, and frequently swelling of the whole of the head; uneasiness about the head; seemingly itchiness about the ears; dulness; frequent but not violent heaving. To these succeed staggering and great debility, until the animal falls, and is afterwards either unable to stand long at a time, or to stand at all. A constant discharge of green bilious stinking fæces now appears; the breath is likewise offensive; the very per-

spiration is sour and putrid; the head swells rapidly; the tongue protrudes from the mouth; and the saliva, at first stinking, but afterwards purulent, bloody, and more and more offensive, flows from the mouth. A crackling is heard under the skin; tumors appear, and abscesses are formed in various parts.

The *treatment* would be, first, and the most important thing of all, to separate the diseased from the sound, which seemed to be in the slightest degree affected, to some isolated portion of the farm where contact with others would be impossible.

The sick only should be taken away, and that as speedily as possible.

In the early stage of the disease there can be no doubt of the propriety of bleeding. The fever, which, according to every account, characterizes the first attack, should, if possible, be subdued. The animal should be bled, in proportion to his size, condition, and the degree of fever: he should be bled, in fact, until the pulse begins to falter or he begins to stagger. The blood should be taken in as full a stream as possible, that the constitution might be more speedily and beneficially affected.

Then we should with great propriety administer a brisk purgative. A pound or twenty ounces of Epsom salts should be given in a sufficient quantity of thin gruel.

Next, we should attend to the diet. Green succulent grass would scarcely be allowed, because it would probably not a little increase the purging; but mashes of bran, with a little bean-meal, carrots, or sweet old hay, should be given in moderate quantities. The fact stands too clearly upon record, that nineteen animals out of twenty, seized with the murrain, have died. That on which I should put most dependence would be the following:

RECIPE.

Drink for Murrain.—Take sweet spirit of nitre, half

an ounce; laudanum, half an ounce; chloride of lime, in powder, two ounces; prepared chalk, an ounce. Rub them well together, and give them with a pint of warm gruel.

This may be repeated every six hours, until the purging is considerably abated; but should not be continued until it has quite stopped.

The purging being abated, we must look about for something to recall the appetite and recruit the strength, and I do not know anything better than the following:

RECIPE.

Tonic Drink for Murrain.—Take columbia root, two drachms; canella bark, two drachms; ginger, one drachm; sweet spirit of nitre, half an ounce. Rub them together and give in a pint of thick gruel.

INFLAMMATION OF THE BLADDER.

This disease does not often occur in cattle, except from eating acrid and poisonous herbs, or when cows are near their time of calving.

The course to be pursued where the neck of the bladder is inflamed is sufficiently plain—the bladder must be emptied, or more fluid will pour into it until it actually bursts. For some time before the fatal termination of the complaint in the rupture of the bladder, not only the constant straining, but the heaving of the flanks, the quickness of the pulse, the loss of appetite, the cessation of rumination, and the shivering fits, will sufficiently indicate the extent of the danger. The better way of emptying the bladder is, if possible, to relax the spasms of its neck. A very large bleeding will sometimes accomplish this; but it must be a large one, and continued until the animal is exhausted almost to fainting.

To bleeding, physic should succeed, in order to lower

the system, and relax the spasm; but no medicine must be given that would in the slightest degree increase the flow of urine. Sulphur, or aloes, or both combined, would be indicated here.

Should not the flow of urine be re-established, mechanical means must be resorted to.

Inflammation of the bladder itself is a disease more frequent, and from the same causes, namely, cold and acrid herbs. Here the animal should be bled and physicked, and fomented across the loins, and every diuretic medicine carefully avoided. The following drink may be administered with good effect, after the bleeding and purging:

RECIPE.

Drink for Inflammation of the Bladder.—Take antimonial powder, two drachms; powdered opium, one scruple. Rub them well together with a small portion of very thick gruel, and repeat the dose morning and night.

STONE IN THE URINARY PASSAGES, OR BLADDER.

Stone in the bladder may be suspected, when there is much fever, accompanied by a frequent turning of the head, and earnest gaze on the flanks; when the hind limbs tremble, and there are ineffectual endeavors to pass urine, or it is evacuated in small quantities, and mingled with blood.

The suspicion may very easily be reduced to certainty, by examining the bladder with the hand introduced into the rectum, or last gut.

The presence of stone in the bladder having been thus proved, that farmer will pursue the most judicious course who sends the beast immediately to the butcher; for no medicine will dissolve it, and the animal will lose condition every day.

CHOKING.

If the rumen is so distended as to threaten immediate suffocation, it will be proper to puncture it; but this, if possible, should be avoided. It will next be desirable to ascertain the situation of the obstruction. Sometimes it will be found that the body is impacted at the back of the mouth or beginning of the œsophagus: in these cases by using a balling-iron, the object can frequently be removed by passing up the hand.

If, however, the substance is situated low down the tube, it will be desirable to force it onwards. For this purpose half a pint of oil should be given to lubricate the passage as much as possible, and then the beast being properly secured, and a gag placed in the mouth, a flexible tube or rod, with a knob at the end, should be carefully passed down the œsophagus until it reaches the body: a steady pressure should now be employed to force it onwards; but this should be done patiently, so as not to injure the parts. By alternately resting and trying again, the object will generally be removed.

No solid food should be allowed for several days afterwards, as there is great danger of a repetition of the choking until the muscles entirely recover their tone. Sometimes, after all attempts of removing the body by the methods before described have failed, it will be proper to do so by means of an operation which has been performed with success; and this consists in making an incision through the skin into the œsophagus, sufficiently large to extract the body. Great care must be exercised so as not to injure the important nerves and blood-vessels situated near the part. The beast should be cast for the operation, and the wound carefully sewed up afterwards, and for several days the food should consist principally of gruel.

POISONS.

The plants that are the most dangerous are the dif-

ferent species of hemlock, and particularly water-hemlock, the fox-glove, the dropwort, and some of the species of crows-foot. These plants are not useful for any purpose, and it is to be lamented that the farmer is not able to recognize them, and root them all up. Young calves and lambs, until they have added some experience to the guidance of instinct, are occasionally lost in very great numbers.

The yew is a deadly poison, and many cattle have been destroyed by it; but they seldom browse upon it when green. The mischief, in the great majority of cases, is done by the half-dried clippings of some formal hedge-row or fantastic tree. In this state cattle are very apt to eat great quantities of the leaves or shoots.

The symptoms of empoisonment vary with the plant that has been devoured. In general the animal moans sadly, as if in dreadful pain; or a sudden stupidity comes upon it—or violent convulsions. After eating the yew-clippings, cattle are often perfectly delirious; and in almost every case the belly more rapidly swells than it usually does in hoove.

It is plain that there can be no case in which more speedy and decisive measures are needed; and yet very little can be done, except that useful instrument, far too little known, Read's patent pump, is at hand. The pipe should be introduced into the paunch, so that the extricated gas which causes the swelling, may escape. After this a quantity of warm water should be thrown into the stomach, sufficient to cause sickness, and thus get rid of a part, at least, of the offending matter. Then, by introducing the pipe only a part of the way down the gullet, a physic-drink may be gradually introduced, which will thus pass on to the fourth stomach, and cause speedy purging. It will usually be advisable to bleed moderately: drinks of vinegar and water, not exceeding half a pint of vinegar at a time, should be administered if it is suspected that the poison is of a narcotic kind, and the purging should be kept up by repeated small doses of the aperient medicine. When

the poison seems to be nearly or quite evacuated, a cordial drink will be beneficial in giving tone to the stomach.

TO DRY A COW OF HER MILK.

The best time to dry the cows is very early in the spring, when they are eating dry meat. A good dose of physic, followed by mild astringent drinks, will usually settle the business, especially if she is moderately bled before the physic is given. Alum in the form of whey, or dissolved in water, will be the most effectual, as well as the safest astringent. Six drachms will be the medium dose. The cow may be milked clean when the astringent is given, and then turned on some dry upland pasture.

Two days afterwards she should be examined, and if the udder is not overloaded, nor hard nor hot, the milking may be discontinued; but if the udder is hard and full, and especially if it is hot, she should be fetched home, cleanly milked, and another astringent drink given. The third drink, if it is necessary to give one, should be an aperient one, and after that a Diuretic drink every second day.

The milking should only be resorted to if the state of the udder absolutely requires it, for every act of milking is but encouraging the secretion of milk.

TO PRODUCE BULLING IN THE COW, AND TREATMENT OF BULL-BURNT.

Some cows are backward because they have been previously starved; a week or fortnight's better keeping will usually effect the desired purpose.

THE COW-POX.

It appears under the form of pustules or vesicles on the teats, which are easily broken in milking, and which,

left alone, break of themselves, and discharge a thin, unhealthy fluid. The pustules are surrounded by a broad circle of inflammation, and if neglected, or roughly handled, occasionally run into ulcers, very foul, and difficult to heal.

At the time of, or a little before, the appearance of the pustules, the animal droops, refuses to feed, ceases to ruminate, and labors under considerable fever. The eyes are heavy and dull; the cow moans and wanders about by herself, and her milk materially lessens, and at length is almost suspended.

It will rarely be prudent to bleed, but the bowels should be fairly opened, and the fever drink (No. 1,) given once or twice in the day, according to the apparent degree of fever. The teats should be frequently washed with warm water, and the following lotion applied morning and night:

RECIPE.

Lotion for Cow-pox.—Take sal ammoniac, a quarter of an ounce; white wine vinegar, half a pint; camphorated spirit of wine, two ounces; Goulard's extract, an ounce. Mix and keep them in a bottle for use.

SHEEP DOCTOR.

DISEASES OF SHEEP.

THE LAMBING SEASON.

The ewe goes with lamb for five months. To enable the ewe to produce her lamb with comparative safety, she should not be too well fed. Too high condition will dispose to fever; on the other hand, with too poor keep, the ewe will not have sufficient strength to go through the process safely, nor will she have milk enough for the lambs.

At night, particularly, they should be folded in some sheltered place.

The ewe, and especially if she was in high condition, is occasionally subject to after-pains. Some of the country people call it *heaving*. Twenty drops of laudanum should be given in a little gruel, and repeated every second hour until the pains abate. It will always be prudent to bleed the ewe, if she is not better soon after the second dose of the laudanum.

Attention should now be paid to the lamb, and it requires it even more than the mother. It is want of care that causes the loss of more than four-fifths of the dead lambs. The principal evil is exposure to cold.

The operation of castration is a very simple one in the sheep, and yet is often attended with danger. The younger the lambs are the better, provided they are not

very weak. From ten days to a fortnight seems to be the most proper time, or, I may say, as soon as the testicles may be laid hold of.

The lamb being well secured, the scrotum or bag is to be grasped in one hand high up, and the testicles pushed down as low as possible: two incisions are then to be made across the bag at the bottom of it, and the testicles forced out. Draw the testicles down an inch or more from the scrotum, and then cut through the cord close to the scrotum with a knife that is not very sharp.

THE DISEASES OF YOUNG LAMBS.

These are numerous, and many of them dangerous; some belonging exclusively to the period which I have been describing, and others often occurring when the animals get a little older.

COAGULATION OF THE MILK.

All the milk that is swallowed by the young lamb coagulates in the stomach, and if it accumulates too fast, the stomach will become perfectly choked with it, and the lamb will be destroyed.

In this disease there is often apparent purging of a light color, which is in fact the whey passing off while the curd accumulates and produces obstinate constipation.

The first thing to be done is to administer an alkali, to dissolve the mass, such as magnesia, in doses of half an ounce twice a day; after which two to four drachms of Epsom salts, with a little ginger dissolved in warm water.

DIARRHŒA.

The combined influence of starvation and cold produces diarrhœa sooner than anything else. Warmth and new cow's milk are the best remedies.

COSTIVENESS.

It is either the accompaniment of fever, or it will very speedily lead on to fever. Bleeding in proportion to the degree of fever, and the age and strength of the lamb, should then be had recourse to. Next, the bowels must be opened; one-fourth of the Purging Drink (No. 2,) will be the best thing that can be given, and it should be repeated every sixth hour until the desired effect is produced.

STAGGERS.

The lamb will appear to be in perfect health. All at once he will stand still, heaving violently at the flanks, and with the head protruded; or he will wander about with great uncertainty in his walk and manner: he will then all at once fall down and lie struggling upon his back until he is helped up, or dies. Sometimes he is very much convulsed.

Bleeding must be resorted to immediately, and afterwards the bowels will open by means of the Purging drink. To this some cooling febrifuge medicine should succeed.

RECIPE.

Cooling Fever Drink.—Take powdered digitalis, one scruple; emetic tartar, ten grains; nitre, two drachms. Mix with thick gruel, and let it be given twice every day.

INFLAMMATION OF THE BRAIN.

The animal gallops about attacking his fellows, attacking the shepherd, and sometimes quarrelling with a post or tree; he is laboring under wild delirium, and this continues until he is absolutely exhausted. He then stands still, or lies down for a while panting dread-

fully, when he starts afresh, as delirious and as ungovernable as before.

The first and the grand remedy is bleeding; and that from the jugular, and copiously, and as quickly as possible. The guide to the quantity will be the dropping of the animal. To bleeding, physicking will of course succeed, and the sheep should be removed into a less luxuriant pasture.

COLD AND DISCHARGE FROM THE NOSE, &C.

The symptoms of catarrh are heaviness, watery eyes, running from the nose. The discharge is thick, and clings about the nostril, and obstructs it, and the sheep is compelled to suspend its grazing almost every minute, and with violent efforts blow away the obstruction. Cough frequently accompanies this discharge.

When the shepherd perceives this nasal gleet, he should keep a sharp look-out over his flock, and if there is one that stays behind, or will not eat, he should catch him, and remove him to a warmer situation, and bleed him, and give him the laxative and fever drinks, and nurse him with mashes and hay.

THE ROT.

Symptoms.—The sheep is dull, lags behind in his journey to and from the fold, and he does not feed well; but there are as much early symptoms of the staggers as of the rot.

This, however, goes on some time, and then a palish yellow hue steals over the skin, easy enough to be seen when the wool is parted, and most evident in the eyelids, and that which is generally called the white of the eyes. The lips and mouth are soon tinged, but not to so great a degree.

The tongue especially becomes pale and lived. The animal is feverish; the heat of the mouth, and the panting, and heaving of the flanks, and general dulness,

sufficiently indicate this. Some degree of cough comes on; some discharge from the nose; or the breath begins to be exceedingly offensive. Considerable swelling appears under the chin; a fœtid purging comes on of all colors.

Remedy.—Tonics and aromatics are usually mingled with common salt; but first of all the bowels are evacuated by some of the usual purgatives, and the Epsom salts are the best. The following prescription should then be tried:

RECIPE.

Mixture for the Rot.—Take common salt, eight ounces; powdered gentian, two ounces; ginger, one ounce; tincture of colombo, four ounces. Put the whole into a quart bottle, and add water so as to fill the bottle.

A table-spoonful of this mixture should be given morning and night for a week, and then the following mixture may be given at night, while the former is continued in the morning, and by which the flukes will be destroyed, as the worms in the bronchial tubes sometimes are in the hoose of young cattle.

RECIPE.

Second Mixture for the Rot.—Take of recipe (above), a quart; spirit of turpentine, three ounces: shake them well together when first mixed, and whenever the medicine is given. Two table-spoonfuls are the usual dose.

The morning dose should be given on an empty stomach, and the evening dose before the night's feed is given, if the animal is housed.

THE FOOT-ROT.

The first symptoms of the disease is the lameness of

the sheep. The foot is hot, and the animal shrinks if it is firmly pressed. It is particularly hot and painful in the cleft between the two hoofs; and there is generally some enlargement about the coronet. The lameness rapidly increases, and often to such a degree indeed, that the sheep is unable to stand, but moves about the field on its knees. The soft portions of the foot, and sometimes the very bones of it, slough away, and drop off.

Treatment.—The foot must be carefully examined, and every portion of horn that has separated from the parts beneath thoroughly removed, and the sore lightly touched with the butyr (chloride) of antimony, applied by means of a small quantity of tow rolled round a flat bit of stick, and then dipped into the caustic. A stronger and oftentimes a better application is made by dissolving corrosive sublimate in spirits of wine. Hydrochloric acid is also a very useful caustic for foot-rot. If a fungus is sprouting at the place where the horn separates from the foot, it must be first cut away with the knife, and then the root of it touched also with the caustic; or, what is still better, it may be removed by means of a hot iron.

Remove the sheep to higher ground.

THE SCAB.

It is first discovered by the animal eagerly rubbing himself against every post, or gate, or bank, or, if the itching is very great, tearing off his fleece by mouthfuls. There will appear on various parts, and particularly along the back, either little red pustules, or a harsh dry scurf.

Remedy.—The mercurial or blue ointment in a greater or less degree of strength is commonly used.

RECIPE.

Mercurial Ointment for Scab.—Take crude quick-

silver, one pound; Venice turpentine, half a pound; spirit of turpentine, two ounces.

These should be rubbed well together for five or six hours, until they are perfectly united. When this is completed, four pounds and a half of lard should be added, and the more rancid it is the better.

The ointment should be gently but well rubbed in.

A milder ointment may be used.

RECIPE.

Mild Ointment for Scab.—Take flour of sulphur, a pound; Venice turpentine, four ounces; rancid lard, two pounds; strong mercurial ointment, four ounces. Rub them well together.

This ointment may be used at any time of the year; but the mercurial ointment is not safe in cold or wet weather.

In very bad cases the following powerful ointment may be employed:

RECIPE.

Take white hellebore, three ounces; bichloride of mercury, two ounces; fish-oil, twelve pounds; resin, six ounces; tallow, eight ounces. The two first ingredients to be mixed with a part of the oil, and the other ingredients to be melted and added.

LICE, TICKS, AND FLIES.

Many washes have been invented to destroy these insects, but few of them have perfectly succeeded. That which seems to have the best effect is thus composed:

RECIPE.

Arsenical Wash for Sheep Lice.—Take arsenic, two pounds; soft soap, four pounds. Dissolve in thirty gallons of water.

The infected sheep should be immersed in this, the head only being kept out; and while he is in this liquid, the fleece should be well rubbed and moulded, so that the wash shall penetrate fairly to the skin.

Other persons prefer the following lotion:

RECIPE.

Mercurial Wash for Sheep Lice.—Take corrosive sublimate, one ounce; spirits of wine, two ounces; rub the corrosive sublimate in the spirit until it is dissolved, and then add—cream of tartar, one ounce; bay salt, four ounces. Dissolve the whole in two quarts of water, and apply a little of it with a small piece of sponge wherever the lice appear.

These washes, however, are not always safe, and they are very troublesome in their application. The ointment which I have recommended for the scab is more easily applied, and more effectual.

RECIPE.

Fly Powder for Sheep.—Take white lead, two pounds; red lead, one pound; and mix them together.

While one man holds the sheep by the head, let another have a dredger or pepper-box containing some of the powder in his right hand, and a stick in his left: let him introduce the stick near the tail of the animal, and draw it gently along the back as far as the head, raising the wool, and scattering in the powder as he proceeds. Then let him dip his hand in some of the coarsest whale oil, and smooth down the wool again, smearing the whole of the fleece with the oil. This will not only destroy the maggots, but prevent the future attack of the fly.

DISEASES OF SWINE.

INFLAMMATION OF THE LUNGS.

This complaint is known among the breeders and fatteners of swine by the term rising of the lights. Every little cold is apt to degenerate into inflammation of the lungs in the fatted or fattening hog.

The early symptom is cough. The animal heaves dreadfully; he has a most distressing cough, which sometimes almost suffocates him, and he refuses to eat.

In many cases congestion takes place in the lungs, and the animal dies in three or four days.

The first thing that is to be done is to bleed, and the most convenient place to bleed the hog is from the palate. If an imaginary line is drawn from between the first and second front middle teeth, and extending backward an inch along the palate, and the palate is there cut deeply, with a lancet or fleam, plenty of blood will be obtained. A large quantity of blood, however, can be abstracted from the vein on the inside of the fore-arm, about an inch above the knee. The application of cold water

with a sponge will generally stop the bleeding without difficulty

The following may be given:

RECIPE.

Fever Medicine for Swine.—Take digitalis, three grains; antimonial powder, six grains; nitre, half a drachm. Mix and give in a little warm swill, or milk, or mash.

In the greater number of cases the animal will readily take this: but if he is so ill that nutriment of every kind is refused, he must be drenched.

This should be repeated morning, noon, and night, until the inflammation is abated. A purgative should quickly follow. The Epsom salts may be given in doses of from one to three ounces.

APOPLEXY AND INFLAMMATION OF THE BRAIN.

Symptoms.—The swine, in the act of feeding, or when moving across the sty, will fall suddenly, as if struck with lightning. He will be motionless for a little while, and then convulsions will come on, strong and dreadful: the eyes will seem protruded, the head and neck will swell, and the veins of the neck will be brought into sight, notwithstanding the mass of fat with which they may be covered.

The course here is plain enough. He should be bled, and bled copiously. Indeed, the blood should be suffered to flow as long as it will. Two or three ounces of Epsom salts should then be given; the quantity and the heating character of the food should be diminished, and a couple of drachms of sulphur given daily in the first meal.

MEASLES.

The red and pimpled appearance of the skin, or of

the cellular substance between the flesh and the skin, sufficiently marks the disease.

Remedy.—Less food and not so stimulating, and occasional doses of Epsom salts or sulphur.

MANGE.

Few domesticated animals are so subject to this loathsome disease as the hog if he is neglected and kept filthy; but in a well cleaned and well managed piggery it is rarely or never seen, unless some, whose blood from generation to generation has been tainted with it, should be incautiously admitted. A mangy hog cannot possibly thrive well. His foul and scurfy hide will never loosen so as to suffer the accumulation of flesh and fat under it.

Except it is hereditary, it may, although with some trouble, be perfectly eradicated. The first thing to be done is to clean the hog well; without this all external application and internal medicines will be thrown away. The animal must be scrubbed all over with a good strong soap-lather, and when he is well dried with wisps of straw he will be ready for the ointment, and no better one can be used than the Mild Ointment for scab in sheep. A little of this should be well rubbed all over him every second or third day; but at the same time internal medicine should not be omitted. There is no animal in which it is more necessary to attack this and similar diseases with energy.

RECIPE.

Alterative Powder for Swine.—Take flowers of sulphur, a quarter of an ounce; Æthiop's mineral, three grains; nitre, and cream of tartar, half a drachm. Mix and give daily in a little thickened gruel or wash.

This, like the scab in sheep, is a very infectious disease, and care should be taken to scour the sty well with

soap, and afterwards to wash it with a solution of chloride of lime. The rubbing-post, that useful, but too often neglected article of furniture in every sty, should particularly be attended to.

SORE EARS.

There are very often troublesome cracks and sores at the back of the large lop-ears of some breeds. If there is any disposition to mange, it is most evident about the ears of these animals, and the mischief is sadly aggravated when brutes in human shape set every ferocious dog at the stray pig, the favorite hold of which is the ear. The Healing Cleansing Ointment for Cattle will most readily heal the sores.

PIGGING.

The sow usually goes with pig four months. A week or ten days before her pigging she should be separated from the rest, otherwise the young ones would probably be devoured as soon as they are dropped.

The young pigs may be cut at three or four weeks old: they should never be suffered to suck longer than two months; and they may be rung as soon as convenient after weaning.

QUINSY.

This disease in the hog is compounded of sore throat and enlargement of the glands of the throat, and is something like strangles in the horse— inflammation and enlargement of the cellular substance between the skin and muscles under the lower jaw.

The patient should be bled; two ounces of salts should be given, and half-ounce doses repeated every six hours, until the bowels are well opened; while warm weak wash, or milk and water, should be occasionally poured into the trough.

COSTIVENESS.

This is not an uncommon complaint of the confined and fattening hog, and is easily removed by Epsom salts, or by five grains of calomel being given in a little of the animal's favorite food.

It will be dangerous, however, to push the calomel beyond the second or third dose, for the hog is very easily salivated.

Sometimes, however, this costiveness is produced by—

INFLAMMATION OF THE BOWELS,

Which is attended by considerable pain, heat and tenderness of the abdomen, with a quick pulse, and other symptoms of fever, and sometimes by fits and insensibility.

The *treatment* should consist of copious bleeding, oily laxatives, clysters, warm fomentations to the abdomen, and, if the animal is not too large, warm baths.

HOMESTEAD EXEMPTION BILL.

PASSED APRIL 18, 1850

Section 1. In addition to the property now exempt by law from sale under execution, there shall be exempt by law from sale on execution for debts hereafter contracted, the lot and buildings thereon, occupied as a residence and owned by the debtor, being a householder and having a family, to the value of one thousand dollars. Such exemption shall continue after the death of such householder, for the benefit of the widow and family—some or one of them continuing to occupy such homestead until the youngest child become twenty-one years of age, and until the death of the widow. And no release or waiver of such exemption shall be valid unless the same shall be in writing, subscribed by such householder, and acknowledged in the same manner as conveyances of real estate are by law required to be acknowledged.

§ 2. To entitle any property to such exemption, the conveyance of the same shall show that it is designed to be held as a homestead under the act; or, if already purchased, or the conveyance does not show such design, a notice that the same is designed to be so held, shall be executed and acknowledged by the person owning the said property, which shall contain a full description thereof, and shall be recorded in the office of the Clerk of the County in which the said property is situate, in a book to be provided for that purpose, and known as the "Homestead Exemption Book." But no property shall, by virtue of this act, be exempt from sale for non-payment of taxes or assessments, or for a debt contracted for the purchase thereof, or prior to the recording of the aforesaid deed or notice.

§ 3. If, in the opinion of the Sheriff holding an execution against such householder, the premises claimed by him or her as exempt, are worth more than one thousand dollars, he shall summon six qualified jurors of his county, who shall upon oath, to be administered to them by such Sheriff, appraise such premises; and if, in the opinion of the jury, the property may be divided without injury to the interests of the parties, they shall set off so much of said premises, including the dwelling-house, as in their opinion shall be worth one thousand dollars; and the residue of said premises may be advertised and sold by such Sheriff.

§ 4. In case the value of the premises shall, in the opinion of the jury, be more than one thousand dollars, and cannot be divided as is provided for in the last section, they shall make and sign an appraisal of the value thereof, and deliver the same to the Sheriff, who shall deliver a copy thereof to the execution debtor, or to some one of his family, of suitable age to understand the nature thereof, with a notice thereof attached, that unless the execution debtor shall pay to said Sheriff the surplus over and above one thousand dollars within sixty days thereafter, that such premises will be sold.

§ 5. In case such surplus shall not be paid within the said sixty days, it shall be lawful for the Sheriff to advertise and sell the said premises, and out of the proceeds of such sale to pay to said execution debtor the said sum of one thousand dollars, which shall be exempt from execution for one year thereafter, and apply the balance on such execution: provided, that no sale shall be made unless a greater sum than one thousand dollars shall be bid therefor; in which case the Sheriff may return the execution for want of property.

§ 6. The costs and expenses of selling off such homestead, as provided herein, shall be charged and included in the Sheriff's bill of cost upon the said execution.

§ 7. This Act shall take effect on the first day of January, one thousand eight hundred and fifty-one.

GOODS EXEMPT FROM EXECUTION IN NEW-JERSEY,

Being the Property of a Debtor having a Family.

One cow; one bed and bedding; one cradle; one stove; one half cord of fire-wood; one half ton stone coal; one spinning-wheel; one table; six chairs; one hog; one hundred weight of flour; one iron cooking-pot; one dozen knives and forks; one dozen plates; one dozen spoons; one half-dozen bowls; two pails; one barrel; one coffee-pot; one tub; one frying-pan; the necessary tools of a tradesman, not exceeding ten dollars in value; and all wearing apparel.